Obstetric and Gynecologic Supplement

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OBSTETRIC AND GYNECOLOGIC SUPPLEMENT

The American College of Osteopathic Obstetricians and Gynecologists

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CONTENTS

Gynecology Through the Ages 3
W. A. Jenkins, D.O., Las Cruces, New Mexico

The Role of Radical Surgery in Cancer of the Female Pelvis 13
A. C. Johnson, D.O., F.A.C.O.S., F.A.C.O.O.G., Detroit, Michigan

Infertility—Its Investigation and Treatment 15
Maurice C. Kropf, D.O., Orrville, Ohio

An Evaluation of the Procedure of Trial Forceps 18
Carl Waterbury, D.O., Chairman, Department of Obstetrics, Des Moines Still College of Osteopathy and Surgery, Des Moines, Iowa

Investigations into the Etiology of Pregnancy Toxemia 21
Julian Lansing Mines, D.O., F.A.C.O.O.G.
Associate Professor of Obstetrics
College of Osteopathic Physicians and Surgeons, Los Angeles, California

The 1957 Meeting of the College 22

GYNECOLOGY
through the ages

W. A. JENKINS, D.O.
Las Cruces, New Mexico

GYNECOLOGY AS A science supposedly began in the first years of the nineteenth century. Yet as we delve into the ancient records we find that thousands of years ago many diseases peculiar to women were being treated. They are mentioned even in the Papyri. Yet we must remember that these tablets of 3,000 to 4,000 years ago were inscribed not by a primitive people, but by members of a civilized nation with a notable architecture.

We cannot think there was ever a time since the "curse" of Eve when there were no abnormal presentations, no lacerations at childbirth, and no menstrual disorders. The concept that the gynecologic diseases of modern women are due to the habits and customs of our advanced civilization is also false. As we uncover the relics of the past we find evidence of many of these disorders. An example is the mummy of Henhenit, one of the wives of Mentuhotep of the XI dynasty, about 2050 B.C. When examined, the bladder almost filled the pelvic cavity, and a tear in the bladder communicated with the vagina, plainly a vesicovaginal fistula with a complete tear of the perineum. This unfortunate young woman of 4,000 years ago probably died in childbirth.[1]

Even when we speak of conditions among primitive women who lived before the time of our earliest records, we are not speaking of the Neanderthal woman of 50,000 years ago, who lived close to the soil. We can only guess at gynecologic conditions among the early primitives by observing uneducated isolated peoples. The few primitive people left in existence have a crude gynecologic therapy that in some measure proves effective.

Today we talk of trace minerals, hormones, vitamins, and antibiotics. How can we assume that the primitive medicine man did not unconsciously use some of them when he administered his concoctions of soil, pregnancy urine, desiccated organs of animals, and pulverized insects? We can scarcely assume that the uncultured peoples cared nothing for the suffering of their womenkind, nor that their absurd therapies were all in vain.

As Robinson[2] has said, we may derive much information from the study of the behavior of the modern savage who has never come under the influence of civilization and thus may be further back in progress than the ancients who are so often quoted.

Years ago, in search of health, I lived in a remote part of Mexico. I was constantly begged to treat desperate cases, but I was far from a source of supplies. It was a 3-day ride on muleback to the railroad, a frightening ride over a narrow mountain trail 2 centuries old, which zigzagged down 10,000 feet and overlooked an area as beautiful as the Grand Canyon. The train came every other day. Supplies were piled on mules and donkeys and toted up that terrible mountain path. Often in those 18 months I was glad to resort to crude native medicines—quinine in the bark, leaves of digitalis, and primitive forms of numerous other drugs included in our modern armamentarium.

When we scan the ancient literature we are shocked to find there many observations and discoveries for which we have honored our modern physicians. However, we cannot agree entirely with Aristotle that "all art and all wisdom have already been explored and again forgotten." Within our own lives have come many new discoveries. The great Osler knew nothing of blood banks, artificial lungs, eye banks, the Rh factor, and test-tube babies. However, we can say with Jenks,[3] "History repeats itself in medicine, as elsewhere." It is impossible for us to tell how much medical knowledge in the past has been gained and then lost amid the various changes of the world's history.

It is well, therefore, to stop now and then in our frantic race for accomplishments and, as Danforth[4] said a decade ago,

> . . . look backward over a part of the road our predecessors have traveled and to view . . . some of the work of the laborers who have built the foundations upon which rest the scientific structure within which we work. This scholastic edifice is not yet complete. So long as men of scientific curiosity continue to be born and to strive to answer the questions which occur to their inquiring minds, it will continue to grow.

Gross[5] remarked almost a century ago that individuals are too much disposed to look with contempt at the knowledge of their predecessors, as if in reality the predecessors had worked and lived in vain and as if science had been reserved as a kind of special gift to the present generation.

It is not a pretty picture I paint of the sometimes ridiculous, often obnoxious, treatments of long ago. It is no pleasure to debunk the claims of some of our respected modern predecessors who failed to read the old masters. With Senn,[6] six decades ago, I believe that "All great discoveries are overshadowed by the labors of a host of earnest and progressive workers which ultimately crown the efforts of a favored few."

The gynecologists have come over no easy road. Today we tend to applaud new discoveries and new procedures even before their merits have been entirely proved. A short while ago the daring innovator frequently faced a jeering crowd of contemporaries, men high in their profession. Often no recognition for his labor came in his lifetime. "Professional jealousy," Senn[7] said, "has always selected for its target the men conspicuous by their honest unselfish work."

We need mention only a few of these. Langenbeck,[8] reporting a successfully amputated carcinomatous prolapsed uterus in 1813, was ridiculed for 26 years, until the patient died and autopsy revealed the absence of her uterus. Lister,[9] who helped to make gynecologic surgery safe, waited a full decade before his great principles of 1867 were generally accepted. The ovariotomists came in for much abuse and slander: McDowell, the "backwoods doctor," the Atlees, "butchers and belly-rippers," Peaslee, Kimball, and others bravely advocated ovariotomy and were heard in silence, or their claims refuted by their peers.[10]

The early advocates of the curet brooked the criticism and opposition of the objectors with a quality of magnificence in the face of abuse and a dogged determination to carry on and convince others of the efficiency of the curet, a simple instrument in constant use

today, with never a thought of the controversy in its early decades.[11]

Space is much too limited to detail the dramatic story of gynecology through the centuries: the attempts at treatment by the ancients; the numerous discoveries acclaimed, then forgotten through the Dark Ages, and revived in the latter part of the Middle Ages; and the burst of enthusiasm for investigation that came with the modern era. The achievements that followed the discovery of anesthesia and asepsis are too many to relate. We can only glance hurriedly down through the centuries.

Most of us have neither time nor talent to add to these achievements, having all that we can do to keep abreast of the times. Yet there may be a few among us who will meet up with a Mrs. Crawford.

Ancient gynecology

Egyptian Era.—The earliest references to gynecologic disorders come from the Egyptians and are recorded in the various Papyri, dating from 2000 to 500 B.C. The Ebers Papyrus discusses disorders of menstruation, diseases of the genitalia and breasts, and those related to menstruation and abortion. Menstrual disturbances were treated by douches of garlic and wine, or mixtures of fennel, honey, sweet beer, and "wonder-fruit." Lactation was promoted by use of a mixture of fragrant bread and poppy-plant, eaten while sitting cross-legged, or the spine was smeared with a concoction of swordfish bones in warm oil. Dates, onions, and acanthus fruit in honey spread on a cloth were applied to the vulva to promote abortion. A poultice of calamine, cow's brain, and wasp dung was applied for 4 days to an infected breast.

Various remedies were used to hasten delivery, such as peppermint applied to the buttocks; a mixture of fresh salt and honey; insertion into the vagina of a plug of fennel, garlic, incense, fresh salt, and wasp dung; or a poultice made of tortoise tail, beetle shell, or other concoctions. Douches for uterine disorders were composed of garlic and cow's horn; cow's bile, cassia, and oil; or hog's bile and fresh dates. If these remedies did not cure, and pustules formed douches of fresh dates in the milk of an ass were recommended.[12]

Leukorrhea was treated by application to the breast, belly, and joints of a mixture of dried liver of a swallow in sour milk. Treatment of prolapse of the uterus consisted of fumigations with wax and hot charcoal, or honey and oil were smeared on with the finger and upward pressure exerted on the uterus.

Injections of medicated fluids evidently were popular, for in the Papyrus Brugsch there are twenty-eight recipes for enemas. Use of pessaries and suppositories is also mentioned.[13] In the Kahun Papyrus, oldest of these documents, and the only one entirely devoted to gynecology and obstetrics, we read of displacement of the womb being treated by drinking the mold from a wooden ship or massaging the body with a mixture of yeast and beer.

The Edwin Smith Papyrus, which dates from about 1700 B.C. but believed to have been an ancient document at that time, has been called a "... hodgepodge of customary magical recipes . . . inherited from the superstitious beliefs of the remotest past."[14]

Hindu Gynecology.—From the Vedas, written somewhere between 4000 and 1500 B.C., we learn of the ancient medicine and surgery of the Hindus. Their gynecology is revealed in the works of Charaka and Susrata, written about 500 B.C.(?), treatment consisting mostly of a mixture of magic, incantations, superstitions, and numerous drugs. The Charaka Ayur-Veda has one chapter on women's diseases, but the Susrata Ayur-Veda is devoted to gynecology and pediatrics. Susrata mentions many instruments, scalpels, lancets, catheters, bougies, syringes, saws, probes, sounds, forceps, a trocar, and a vaginal and rectal speculum. This great number of instruments suggests a high degree of civilization at least 1,000 years B.C.[13]

Charaka listed 500 medicinal plants and Susrata 760. Charaka described twenty-four types of female disease, treated according to the humor causing them. Uterine tumors were treated by applications of the flesh of shellfish mixed with tamarind bark.[12] Hindu women apparently suffered from bladder calculi as much as did apparently suffered from bladder calculi as much as men, but since the operation was dangerous, the husband had to participate in it and share the blame for its consequences.[12,13] Even with their superficial knowledge of anatomy, the Hindus dared to perform abdominal surgery, even making the first mention of abdominal section.[13]

Hippocratic Gynecology.—In the era of Hippocrates who lived 4 centuries before Christ (460-370 B.C.), obstetrics and gynecology were practiced by both men and women. The true works of Hippocrates contain little gynecology. It is in the pseudo-Hippocratic works that are found the most valuable teachings on the subject. The absurd belief that the uterus wandered about the body like an animal prevailed in these works and, in fact, persisted for many centuries. Menstruation was considered a cleansing process, another idea long maintained, even to the most modern times.

Hippocrates held that sterility could be due to malposition of the cervix, to excessive smoothness of the uterine lining, to obstruction of the os from engorgement of the veins during amenorrhea (engorged veins do not retain semen), to profuse menstruation (blood vessels to weak to retain the semen), or to prolapse of the uterus.[15]

Examination in uterine disorders was thorough and included observation of the eyes, tongue, height, skin, and any swellings of the abdomen; inspection of the breasts and nipples; and digital examination of the vaginal and cervical walls. While he does not mention the vaginal speculum or the obturator, it has been thought that they were used, since Hippocrates wrote that ulcerated parts of the rectum were examined with the speculum. Also Galen, who quoted Hippocrates, differentiated between the katoper, used in examination of the rectum, and the dioptra for inspection of female parts.[15]

More than 300 substances are recommended in the Hippocratic works for treatment of gynecologic diseases. Fumigation was a favorite remedy. Pessaries of wool or lint tied with a string for easy removal were used to soften the cervix and to soothe uterine inflammation. Various fluids were injected into the vaginal canal with the patient in the Trendelenburg position. Pessaries saturated with cantharides, elasterium, colcynth, and other preparations were used to induce abortion. Leaden, tin, or wooden sounds and dilators were also used.

For 1,000 years after the death of Hippocrates no advancement was made in any branch of medicine. Those who followed his teachings quoted him almost verbatim, often without mentioning their source. It has been said that medicine changed so little in the succeeding centuries that a graduate of the medical school of

Cos who had learned gynecology and obstetrics from the lips of Hippocrates would have learned little that was new if he had attended the lectures of Astruc at the University of Paris 2,000 years later.[15]

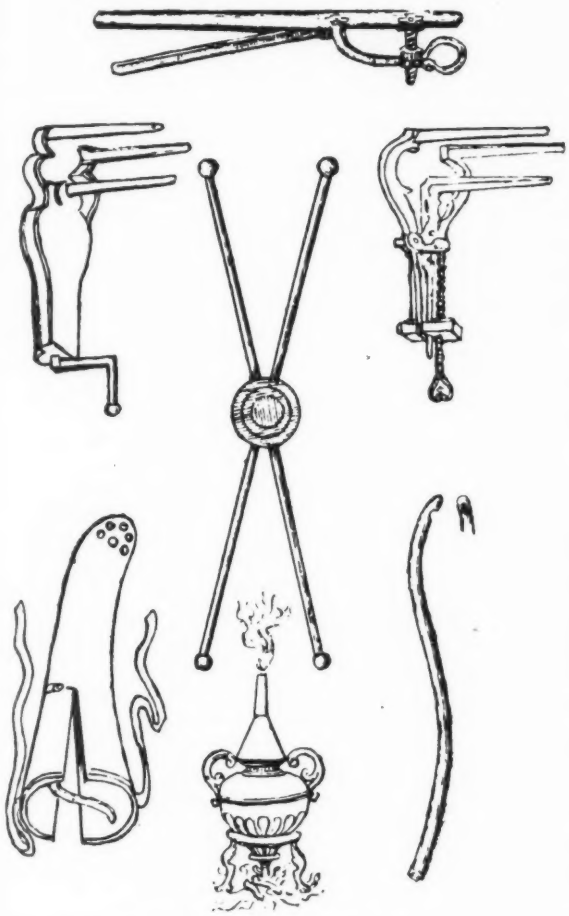

Fig. 1. Ancient gynecologic instruments (from E. W. Jenks).

Greco-Roman era (156 B.C.-576 A.D.)

From about 150 B.C. almost to the seventh century A.D., no progress was noted in gynecology or obstetrics. Roman medicine was almost entirely in the hands of Grecian physicians in Rome. The great medical writers of the first century of the Christian era were encyclopedists who collected all the medical lore up to that time.

Celsus, writing in the first century A.D., quoted writers whose works no longer exist. In obstetrics and gynecology Celsus followed the teachings of Hippocrates and added some material from the Alexandrian writers. He is known particularly for his descriptions of decapitation of infants in the transverse position and for his mention of podalic version. Much more interest was shown in the writings of Celsus centuries later than was evident in his own era.[15] Because of his excellent classic Latin style, a half century ago his work was recommended for reading by medical students.[16]

At the time of Celsus, women were attended by physicians except for minor diseases which were cared for by midwives. There were a number of well-trained women physicians, some of whom wrote treatises on diseases of women. Agnodice, masquerading as a man, attended her countrywomen and was tried and convicted for this offense, but the women rallied to her aid and brought about legalization of the practice of medicine by women. Sotira, Salpe, Lais, and Elephantis all were women medical writers.[15]

Aretaeus, who is believed to have lived in the first or second century A.D., in his book on "Causes and Indications of Acute and Chronic Diseases," described female diseases and their treatment. Since he was a copyist, his works were omitted by the compilers until the time of Aetius and Paulus. From then on, until his manuscript was found in the sixteenth century, he was forgotten.[13,15]

Rufus of Ephesus, who lived in Rome during the reign of Trajan (98-117 A.D.), was freely quoted by the Byzantine compilers. He was a leading medical authority of his day and the Arabs esteemed his work; Rhazes in his "Continens" quoted him 377 times.[15]

Soranus (98-138 A.D.), who lived during the reigns of Trajan and Hadrian, was the greatest gynecologic authority of ancient times; he was also outstanding in medicine, obstetrics, and pediatrics. Many later writers quoted him, often without giving him credit.[15]

His crusade against the superstitions of the midwives led to establishment of standards in midwifery not excelled until the time of Paré in the 16th century. His gynocologic treatise, the most important for many centuries, is not merely a compilation but included personal descriptions based upon dissections of humans, as he pointed out, not of monkeys or pigs. He discussed uterine displacement and expressed disapproval of the old methods of treatment, such as abrading the parts with a bag of hair and filling the vagina with moistened cinders and castoreum. His method of treating a prolapsed uterus is discussed later.

Soranus, like others, quoted writers whose words have been long lost. He acknowledged his indebtedness for his anatomy of the uterus to Herophilus of the fourth or third century B.C. who is said to have dissected 600 criminals.[13] He noted that the best time for conception is just after the menstrual period and that the third month is most favorable for miscarriage. For contraception he recommended insertion into the vagina of a plug of linen before intercourse, or an astringent pessary such as pine bark, ground sumac in raisin wine, or ground pomegranate rind.[13] He used a speculum to determine the site of uterine bleeding and a sound to plug the os during hemorrhage. He cautioned against burning the patient during fumigation.

Galen (129-201 A.D.) was the supreme medical authority of his time and of many centuries after. He was the greatest compiler of medical literature, and eighty-three of his books are considered to be genuine. Blind following of Galenic medicine is said to account for medicine's failure to progress for so long, even beyond the Renaissance. Galen eclipsed all his predecessors in the field of experimentation, but added little to gynecology, most of his comments coming from Hippocrates. His anatomy of the uterus and its appendages, being built upon dissections of cows and goats and information received from midwives, was inferior to that of Soranus.[13,15] However, he accurately described the fallopian tubes and noted the transit of the ovum to the uterus. He was first to specifically mention the vaginal speculum, although it had long been in use; it was among the instruments buried at Pompeii.

Galen's gynecologic therapy consisted of the usual prescriptions and fumigations. His fumigator was a long tube of metal, perforated on each side and having a blunt conical tip, at the end of which was a sow's bladder. The other end was inserted into the vagina to irrigate with mare's milk. Following vaginal treatment, a lead, bronze, or tin tube was inserted to prevent adhesions and to permit injection of medications.[15]

Byzantine gynecology (416-735)

With the death of Galen at the close of the second century A.D. the brilliant period of medicine represented by Rufus, Soranus, and Galen came to an end. In the fourth century when Byzantium was the capital of the Roman Empire a new era in medicine began. Although there was no original research, it became the period of great compilers of medical literature. The Mohammedan creed forbade examination of women except by one of their own sex.[3]

Oribasius (c.325-403) of Pergamum studied in Alexandria and settled in Constantinople. Julian the Apostate entrusted to him the compilation of the works of all the celebrated pagan physicians to his time. His excellent encyclopedia of medicine, in which he was careful to quote his sources, extolled Galen and enshrined him as the medical authority for hundreds of years.[15] His three types of pessaries and his treatment of menstrual disorders will be described later.

Aetius of Amida (502-575), royal physician to Justinian I in the sixth century, must have found in the great Alexandrian library copies of all the great works in medicine then in existence, over which he pored for endless days.[17,18] His sixteenth volume reviews all the gynecology of the Greco-Roman era and remained a favorite text for 1,000 years.[19] He made frequent mention of the speculum or diopter in the treatment of polyps and other uterine growths, ulceration, and other disorders of the female genitalia. He also made constant use of the sound. His treatment of imperforate hymen was that of Archigenes, who has been termed the "Marion Sims of ancient gynecology," and this method was little changed for centuries. Aetius' treatment of imperfect vaginas is said to have preceded Amussat's operation for creation of an artificial vagina by 1,800 years.[17]

He remarked that whatever woman contributed to conception came from the fallopian tubes; that the mouth of the nonpregnant uterus will admit the point of a sound, but the canal is closed during pregnancy; also that the lining of the uterus thickens during menstruation, facts that were lost sight of even to the beginning of the nineteenth century.[17] His chapter on abortion showed the perfection of that procedure 2,000 years ago and his description of the use of the sound was unequalled for 1,500 years.

He treated cancer of the breast by cautery according to the method of the great gynecologists of the first century, Archigenes and Leonides. Until the time of Paré, the ligature was not used because the ancients considered cancer due to black blood and this had to run out after the hemorrhage had been stopped by cautery, followed by further cautery to remove all traces of the disease.

Paulus Aeginta (625-690), a learned physician, gynecologist, and surgeon who lived a century after Aetius, was the last of the great compilers of medical literature. He summarized all then known regarding obstetrics and gynecology.[20] Most of his material was taken from Galen, Oribasius, and Aetius, but usually he did not bother to credit those he quoted. He gave not only recipes for treating the diseases he so well described but also case histories. His speculum is pictured in the illustrations of Scultetus and resembles the speculum of Albucasis 5 centuries later. His description of cancer of the uterus is copied verbatim from Archigenes, without acknowledgement of the fact.[12] Leonard[20] points out that Paulus referred to lacerations of the cervix uteri during labor and their treatment, although Emmet centuries later was given the glory of being the first to recognize the affection.

The Arabian writers quoted Paulus constantly and considered him the most eminent of the great masters. Paulus himself regretted that he had nothing new to offer in medicine, that all had been already said on the subject.[21] The work of Paulus bridged the gap between the excellent treatise of Soranus of the Greco-Roman period and the works of the great Arabian translators. When the Arabian manuals were translated into Latin during the revival of learning, Paulus' gynecology again became prominent.[15]

Arabian gynecology

The world is forever indebted to the Arabian translators for the preservation of the ancient medical classics. During the Dark Ages obstetrics made few advances and gynecology even fewer. The Arabian gynecology was that of Galen, Oribasius, Aetius, and Paulus. Since the Arabians had no first-hand knowledge of anatomy, dissection being forbidden by their religion, they depended upon clinical observations entirely, yet they went beyond their predecesssors in differential diagnosis.[15]

Rhazes (850-923), a great clinician, prepared a resume of the ancient gynecologic writings, embellished with his clinical experience, and he stood high among his colleagues. He discussed many of the diseases common to women, including the disorders of menstruation, prolapse of the uterus, polyps, and other conditions, with treatments that sound queer today. For uterine hemorrhage he cupped the breasts and packed the vagina with wool smeared with a mixture of frankincense, wild pomegranate flowers, gall, antimony, acacia, and alum. To restore a displaced uterus he advised grasping the cervix and pulling it in the opposite direction. For treatment of imperforate hymen he preferred incision, followed by daily intercourse to keep the orifice open, to the usual use of leaden tubes.[15]

Albucasis (936-1013) born near Cordova, Spain, wrote thirty books on medicine and copied much of his material verbatim mostly from Paulus, without giving credit, but he was the first to describe a case of ectopic pregnancy.[22] He was also the first to describe herpes of the uterus and to recommend introduction of an air pessary into the vagina.[23] Since he described circumcision he is thought to have been a Jew. Among the Arabians Jewish physicians were highly regarded.

Avicenna (980-1037) living about a century after Rhazes, with his "Canon" dominated the medical schools of Asia for 6 centuries.[2] As chief physician in a famous Bagdad hospital he was able to write hundreds of treatises, few of which remain. He gave a good description of his instruments, among them a trumpet-shaped, bivalved speculum used in treating uterine abscess and a cervical dilator with a mirror used for fetal extraction.[15]

Jewish records from the time of Moses about 1,500

B.C. to the time of Hippocrates in 400 B.C. gave little gynecologic information. The Talmud contributed little more, but brief mention is made of the speculum. By introduction of a leaden tube and an intratube pack, differentiation was attempted between uterine and vaginal bleeding, because of the hygienic laws regarding the uncleanliness of menstruation. St. Mark's mention of the woman with the issue of blood is a rare instance of a gynecologic disease recognized in the Bible. The Jews and Mohammedans shared a common contempt for the charms, amulets, and saintly relics believed in by the early Christian physicians.[15] The greatest of Jewish physicians, Moses Maimonidas, a rabbi of Cordova, was not a gynecologist.

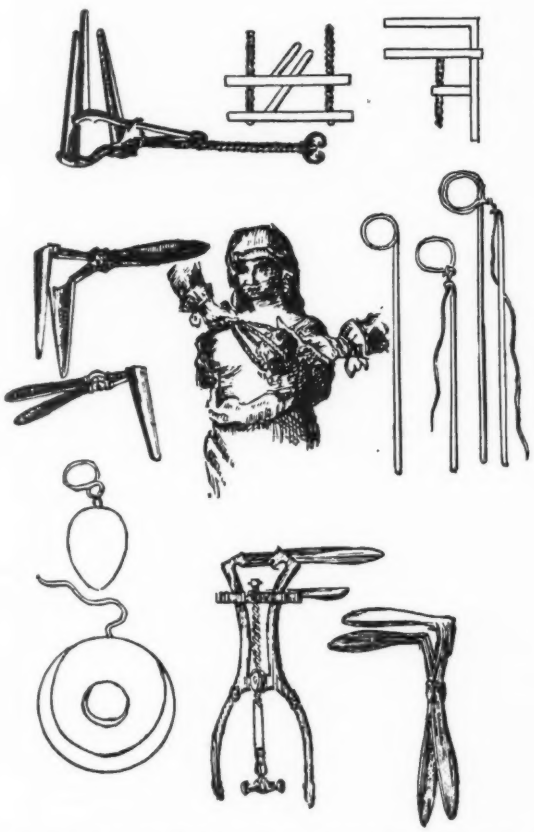

Fig. 2. Ancient gynecologic instruments and removal of breast (from E. W. Jenks). Note similarity between this illustration of breast removal and that of Scultetus in Fig. 3.

Middle Ages (1096-1438)

Treatment of women's diseases is mentioned only briefly by the writers of the medieval period and then they have quoted verbatim from the Arabian texts.[19]

During the Middle Ages there were a number of women practitioners who taught the midwives and wrote medical texts. Many of them were at the great School of Salerno, established in the ninth century and prominent for 4 centuries. Trotula, wife of a physician and mother of two physicians, lived in the eleventh century.[24] Her book on women's diseases is regarded by Garrison[22] as a hodgepodge of superstitions, aphrodisiacs, and measures to promote or prevent abortion. However, she gave an excellent description of perineal lacerations and perineorrhaphy, and her book was repeatedly quoted by other writers.[15-24]

In the thirteenth century the Church dominated medicine and regarded with suspicion any freedom of inquiry, but Ricci[15] points out that the bright spot in those dark years was at Palermo, Sicily, where the Arabian, Jewish, and gentile intellectual development was untrammeled. There the massive Arabian medical tomes were translated, and through them came a revival of interest in medicine throughout Europe.

In the fourteenth century and the first half of the fifteenth century the old order gradually disintegrated. It was an era of dissection, which had been forbidden for 1,500 years, and interest in anatomy and pathology was revived. After the dissections of Mondino at Bologna in 1315, gynecologists threw away the old idea of a wandering uterus and it became a fixed organ. Yet there were few innovations in gynecology, the ancient medicine being blindly followed. Guy de Chauliac, the surgical authority of the fourteenth and also of the fifteenth century, covered the field of gynecology in four brief paragraphs in his book, "Inventarium Partis Chirurgicalis Medicine."[15]

Renaissance (1453-1600)

With the crusades at an end, the hold of the Church rapidly waning, the Hundred Years War over, printing invented, and the New World discovered, a nationalism developed and a new interest in medicine evolved. Berengario da Carpi, professor at Bologna in the beginning of the sixteenth century, and Cellini, who dissected 100 human cadavers, brought a new knowledge of gynecologic anatomy. Strangely, Celsus' work, forgotten through the Middle Ages, became the favorite text. Vesalius through his epochal illustrated book described the entire genital tract. He was the first to use the words "luteum" and "placenta."[15]

The great works of Platter, Primerose, Wolff, and Spach, with a review of the ancient works, brought a new knowledge and interest to the practice of gynecology.

Paré,[25] great surgeon and a noted gynecologist, was the most outstanding figure of his age. He designed an ovoid pessary of gold, silver, or brass for spraying aromatic drugs to the vaginal parts and to provide drainage of ovarian secretions. His therapy of prolapsed uterus typifies the level of gynecology of that day. He described placement of cupping glasses at the navel and hypogastrium, injection of strong medications into the neck of the uterus, stinking fumigation into the private parts, and sweet things to the nose. The prolapsed part was anointed with oil of lilies, fresh butter, and capon grease and carefully thrust back into place. Then the genitals were sprinkled with an astringent powder composed of pomegranate pills, cypress nuts, galls, roach crystals, horse tail, sumac, and barberries boiled in water in which smiths had cooled their irons. Then his special pessary was inserted. He agreed with Paulus that the womb can be safely incised and cited a case of his own in which a gangrenous uterus had been amputated. Paré also advocated repair of third-degree tears.[15]

It might be well now to retrace our steps and briefly consider some of the diseases described by the various writers up to the sixteenth century, their treatments, and also, the many instruments found so important through those years.

Early instruments

The vaginal speculum is among the oldest of gynecologic instruments. It went through periods of common use, of long neglect, of revival with condemnation, long disuse, and then renewed use. Hippocrates mentioned a rectal speculum, and since he discussed examination of the os and the cervical canal, he may also have used a vaginal speculum; all the ancient writers made frequent reference to its use. Two-bladed specula were described by Paulus, Galen, Albucasis, Paré, Scultetus, Heister, Franco, Jobert, Ricord, and Récamier; three-bladed specula by Fabricius, Paracelsus, Mauriceau, Busch, Hatin, Weiss, and Charrière; four-bladed specula by Segalas and Scanzoni; a five-bladed speculum by Beaumont; a six-bladed one by Magenty.[15] Up to the time of Récamier the speculum was used only for treatments, not for diagnosis.

The Arabs made no mention of the speculum, since examination of the genitals was forbidden. Soranus called the speculum a diopter.[15] Galen explained that the speculum was an anal dilator and a diopter a vaginal dilator.[19] In the ruins of Pompeii, buried in 79 A.D. when Soranus was about 10 years old, were found three types of vaginal specula, with two, three, or four valves, which indicate the common use of this device. Mauriceau's speculum of 1682 resembled the three-bladed instrument of Pompeii, except that a cramp-handle was added to the screw.[26]

Aetius used the speculum in treatment of pelvic abscess. The speculum of Albucasis in 1087 was a replica of that of Aetius 700 years earlier. Rhazes used the speculum in treating cervical "hemorrhoids" and lacerations. Avicenna suggested use of a mirror to improve the field of vision. Eight centuries later (1798) Arnaud made the same suggestion, and a half century after that (1845) Sims used a mirror for the same purpose. The speculum of Scultetus in 1653 was probably never used by himself since he depicts it introduced with handle downward.[18,25]

Jacobus Rueffus in 1587 showed a three-bladed speculum for dilatation of the uterus in difficult parturition, which von Gersdorff had illustrated earlier but which had been unnoted. The speculum of Wierus in 1657 was flat bladed.[27] Primrose in 1665 mentioned the use of the instrument as common practice.

Use of the speculum by Paré in the sixteenth century, by his pupil, Guillemeau, by Dionis in 1718, and others shows that the French and other Europeans were familiar with this instrument.[3] Astruc in 1761 described its use to dilate a contracted vagina and to send fumigations to the uterus, 40 years before Récamier's so-called discovery of the speculum. Récamier began use of the instrument in 1801 but did not announce it for 20 years. Madam Boivin independently introduced a bivalve speculum in 1825.

Levret in 1766 proposed use of a vaginal speculum in treating vesicovaginal fistula.[25] In connection with his historic operation for that disease, Sims invented a duck-billed speculum which, being cumbersome and requiring the aid of an assistant, has been modified many times.

When the speculum was introduced in London it was regarded with horror and condemned as indecent.[28] The controversy was vigorous and acrimonious in the middle of the nineteenth century. On the continent the speculum was extensively used in investigation of venereal disease in prisons, hospitals, and dispensaries. In Paris prostitutes were lined up every morning in the hospitals and dispensaries and, while in the lithotomy position, were examined in the presence of students and visitors.[26,29]

During the eighteenth and nineteenth centuries there was a mania for inventing new types of specula. Ricci,[19] in his history of gynecologic instruments, illustrates 540 types, arranged according to the date of their invention. He states that within 136 years there were 600 variations.

Fig. 3. Breast operations in seventeenth century. (I) Ulcerated cancer of the breast. (II) Excision of breast with knife. (III) Breast after removal. (IV) Cautery with hot iron. (V) Drainage of thoracic fistula. (From Scultetus, J.: L'Arcenal de Chirurgie. Chez Antoine Cellier Fils, a Lyon, 1678).

The sound is another instrument long used by the ancients and forgotten until modern times. Aetius passed a sound into the cervical os to prevent cutting too high when removing vaginal growths and recommended its use in directing the midwife's finger when straightening the uterus.[13] Avicenna, Soranus, and Oribasius used the sound. Hippocrates used it in fumigating the organ. Wierus in 1657 and Astruc in 1761 recommended its use. Except spasmodically, the sound was little used in the intervening centuries. Lair's directions for its use in 1828 received little attention.

Simpson in 1843, Huguier in the same year, and Kiwisch in 1845, working independently, devised new sounds. Simpson who popularized its use in diagnosis claimed no priority, but noted that the ancient writers and those of the sixteenth and seventeenth centuries used the sound only for treatment, particularly dilatation of the contracted os.[17] Récamier used a sound in conjunction with his curet; after Simpson reintroduced the sound, it was chiefly used for diagnostic purposes.[30]

Tents were long in common use for dilatation of the cervix and to permit introduction of the finger into the uterus after the cervix had first been softened by fumigation.[31] Sponge tents were steeped in wax which

melted within the vagina and cervix and caused expansion. Aetius, quoting Archigenes, told of using a succession of sizes until dilatation was accomplished.[27] à Castro in 1603 reported dilatation of the cervix with tents of expansive material such as roots of gentian, aristolochia, bryonia, and cyclamen.[13]

The sponge tent devised by Simpson in 1844 for dilatation of the cervix was first boiled in an alkaline solution, then cut to shape, soaked in a weak solution of carbolic acid to prevent odor, and dipped into mucilage of gum acacia. A wire was run through the center of the sponge, after which it was tightly wrapped and the wire removed. When half dry, it was unwound and tightly rewound. Then it was smoothed with sandpaper, and a cord was run through it and sewed at the tip to prevent breakage and insure its remaining in place.

A sea-tangle tent was described by Thomas for cervical dilatation; it was made from an aquatic plant which when moist swelled to three times its size. This contained no animal matter and was odorless. Greenhalgh of London preferred tubular tents to solid ones since they dilated more rapidly.[27] Thomas[27] noted that peritonitis and uterine cellulitis had been reported following use of tents, and he reported the death of a patient from tentanus within 24 hours after withdrawal of the second tent.

Pessaries were a favorite means of applying medications to the uterus from the earliest times. The story of their use cannot be sufficiently covered here. The early pessaries were made of wool or lint, smeared with honey and collyrium, or dipped in fat with medications added, and were used for every kind of female disorder.[3] The Hindus gave numerous receipts for these pessaries.

Hippocrates used pessaries to control uterine hemorrhage. Astringent pessaries were utilized in the therapy of sterility resulting from uterine displacement and to contract or strengthen the uterus. Amenorrhea was treated with pessaries of powdered alum in balm and also pessaries of beef gall. Purgative pessaries were inserted following delivery to promote lochial discharge, to expel the placenta, in prolapsed uterus, and also to produce abortion."[13] Instead of the wax and lard base of modern times, the ancients used beef or deer marrow or goose fat.[18]

Oribasius used an emollient pessary consisting of medications in an oily or fatty base in the treatment of inflammation and ulceration or displacement of the uterus, and aperient pessaries for provoking the menses and relaxing a contracted uterus. Astringent pessaries used to suppress discharges and to reduce prolapse were made by saturating pledgets of lint with various drugs; usually a string was attached for easy extraction.

Among the odd substances provided in the pessaries were ass and goose fat, ashes of dried grape pulp, ox gall, salt, oil of narcissus, cyprus plant, blossoms of wild glasswort, mouse dung, powdered quince, aromatic oils, mandragora juice, and wormwood.[15]

Heister[32] in 1739 published an excellent surgical textbook with many illustrations. He showed oval, quadrangular, and triangular pessaries, perforated in the middle and formed of cork or wood covered with wax, silver, or gold. He also described an elastic pessary of steel wire in the shape of a conical worm. Heister illustrated prolapse of the uterus and the various pessaries used in treatment.

Paré is often credited with invention of the pessary, but Rousset said in 1581 that he had visited a patient who had been wearing a pessary for 40 years.[13] Bauhin in his translation of Rousset's work observed that German women were accustomed to wear an empty walnut shell covered with wax in cases of prolapsed uterus.

The air pessary was used by the ancient physicians. They inserted animal bladders into the vagina and inflated them to produce dilatation. Aveling[33] thought that Rees first mentioned air pessaries in 1810; they consisted of a small, soft, airtight bladder or bag with a valve at one end which was inserted into the vagina; the patient blew up the bag with a flexible, movable tube. Pessaries gradually fell into disuse until reintroduced by Simpson.[13]

Early therapy

The early therapies of female diseases seem largely ridiculous today. Many were trial-and-error methods that in time were abandoned, but some continued to be used in modified form for centuries. McMurty[29] wrote:

> To the superficial observer it would appear that our predecessors from the age of Hippocrates down to the latter quarter of the nineteenth century had almost lived in vain, and that medicine as a science emanated from very recent times. But one has studied history to little purpose if he has failed to learn that all knowledge is correlated, that a single observation of Nature's work may lead to important scientific discoveries, and that the perfection of achievement is based upon the accumulated knowledge of successive generations.... We are impressed most profoundly with the culmination, and are prone to overlook the early steps in the progress of knowledge. It is both becoming and illuminating to revert to the pathfinders, and while doing homage to their discoveries, consider also their influence upon the teachings of the present time.

While we smile at the ancient remedies, we wonder sometimes why many of them continued in favor for many centuries if they were entirely without value.

Irrigation of the vagina is an old accepted practice. The Ebers Papyrus gives twenty-eight medicinal receipts for vaginal and rectal enemas.[31] Hippocrates used injections to wash out placental remnants, to promote menstruation, and in the treatment of ulceration.[34] Antyllus made use of irrigations to soften, contract, cool, or warm the tissues, to dispel gases, and to allay pain.[3] The word douche was not used until the fourteenth century; Celsus called it a "falling stream."[3]

Astrúc in the eighteenth century urged that astringents be combined with emollients to prevent uterine inflammation. Behrends, about half a century later, used irrigations in the treatment of metritis, beginning with barley in rose honey, then if the secretion was of dark color, an infusion of millefolium, myrrh, copaiba balsam, and turpentine. About the same time, Ashwell of Guy's Hospital warned of complications following injections and approved their use only in cases of uterine degeneration or sterility. He emphasized that, first, if leukorrhea had existed for a long time, it should not be relieved suddenly for fear of evil consequent to the system's having become used to the disease and, second, in old debilitated and scrofulous women the suppression of such secretions could not be well undertaken without first improving general conditions.[34]

Hausmann in France described a case of leukorrhea treated by injections, followed by metroperitonitis, due to fluid entering the peritoneal cavity. Vidal de Cassis, experimenting upon cadavers in 1840 noted that fluid entered the oviduct in one case and the uterine blood vessels in another, but when administered mod-

erately, the fluid entered neither. Reassured by Vidal's findings, Velpeau advocated injection therapy and expressed a preference for silver nitrate to iodine solutions. Noeggerath in 1861 noted the serious reactions following the use of silver nitrate, mercury, and concentrated mineral acids, but Sims stated that injection of glycerin, tincture of iodine and persulfate of iron into the uterine cavity was perfectly safe if proper dilatation of the cervix insured return of the fluid; otherwise attacks of uterine colic and other painful symptoms might arise.[34]

Fumigation of the vagina and uterus was practiced by the ancient Egyptians, Hindus, and Greeks and by many others in succeeding centuries in treating many types of uterine disease. The Ebers Papyrus recommended having the fumes of wax and charcoal penetrate the uterine cavity. Hippocrates advocated fumigations with aromatic drugs to promote menstruation. He wrote:

> If a woman does not conceive and wishes to ascertain whether she can conceive, having wrapped her in blankets, fumigate below, and if it appears that the scent passes through the body to the nostrils and mouth, know that of herself she is not unfruitful.[13]

Hippocrates also recommended fumigations for sterility, prolapsed uterus, leukorrhea, to promote lochial discharge, for expulsion of the placenta, and to check morbid uterine discharges.[3]

The purpose of fumigations was to open the cervix and fill the uterus with medicated vapors. Pliny suggested fumigating with garlic, ammi, and rue.[22] The early writers, in keeping with their belief that the uterus was a wandering animal attracted by pleasing odors and repelled by noxious smells, fumigated the vagina with aromatic concoctions and had the woman inhale fetid odors. The aromatics consisted of frankincense, spikenard, cassia, and storax.[13]

The usual procedure was to place water and an aromatic substance in a large vessel with a reed running through the lid. The cervix was dilated, and then the vessel was set over a hole in the earth containing burning wood and charcoal. As the fumes arose, the reed was inserted in the vagina.[31,35] Soranus described the vessel used by Strato, pupil of Erasistratus, as being made of silver or bronze and covered with a lid of tin. Oribasius, quoting Antyllus, recommended that a similar vessel be placed beneath the obstetric chair, a common practice among primitive people.[35]

Application of leeches to the cervix through a tube was common practice from ancient times up to the twentieth century. Their use was advocated by Guilbert in 1826. Mitchell in 1849 described the procedure. Eight to ten leeches were placed in a glass speculum plugged with lint at one end to prevent escape of the leeches at the mouth of the vagina. The tube was introduced and the leeches pushed up with the plug of lint. In 10 minutes the plug was withdrawn and the speculum retained until, in 10 to 20 minutes, the engorged leeches had dropped through the tube. Any that adhered to the membranes were removed by applying to the head of the leech[19] a camel's-hair pencil dipped into salt solution.

An instrument maker in 1866 showed leech cages of wire gauze to be applied to the cervix.[19] Gynecologists in 1893 were still recommending use of leeches in uterine disorders. Leeches being hard to obtain, mechanical leeches were invented to scarify the cervix.

Cupping was favored by Hippocrates; the cups were applied below the breasts in treating menorrhagia and between the breasts to stop menstrual bleeding. Paulus warned against cupping too near the breasts as the cups might sink in and be difficult to remove.[13] Following reduction of a prolapsed uterus Hippocrates advised cupping at the haunch, but Paulus preferred cupping at the navel. Soranus advised cupping in cases of amenorrhea.

Cupping horns have been found in Egyptian tombs. The Hindus practiced cupping, bleeding, and use of leeches. They applied the larger end of the cupping horn over the scarified area and sucked air through a small hole in the pointed end. Sometimes they used a gourd, making a hole in it through which they inserted a burning rag.

The cups of Celsus were made of horn or of copper. Oribasius mentioned glass cupping instruments. Paulus preferred copper to glass cups as they could stand more fire. Oribasius warned against silver cups as they might get too hot and cause burns. Paulus also described a dry cup, the vacuum being created by lighting a rag within the vessel. If dry cupping proved ineffective, then he advised scarifying the spot and using the dry cups again.[13]

Before closing this discussion of treatments by the ancient physicians and those of the Middle Ages, mention should be made of clitoridectomy or female circumcision. In the beginning this was a tribal custom almost as vicious as that of infibulation and the later use of the "girdle of chastity." Clitoridectomy was practiced among certain tribes of Africa, Indonesia, and Peru; knives of stone or metal were used. In some cases part of the labia and clitoris was removed, in some only the labia, while in others only the prepuce was incised. Among the Arabs it was a deep insult to call a man "son of an uncircumcised woman."[36]

Garrison stated that among Sudhoff's discussions in his Dresden Catalogue of 1911, he notes circumcision of women about 4,000 B.C. and a plaque recording a suit for the costs of clitoridectomy in 163 B.C.[22]

In some primitive people, for example in Abyssinia, this was an established custom because the clitoris developed to an exceptional size and interfered with intercourse and made childbirth difficult. As emphasized by Ploss,[36] most of the customs of primitive people were interwoven with pregnancy and childbed. The rites and habits associated with sex matters were closely interwoven with magic.

Hypertrophy of the clitoris and infections of the organ were described by the ancient writers. Aetius recommended excision of the clitoris by seizing it with forceps, pulling it forward and then resecting it close to the teeth of the forceps. Paulus in the seventh century noted this Egyptian custom, and Avicenna mentioned removal of the nymphae by the knife or by cautery.[3,13]

During the middle of the nineteenth century when gynecologic surgery became popular, excision of the clitoris became almost a mania, but, fortunately, it was short lived.[37]

Seventeenth century

The seventeenth century was the era of Harvey, Leeuwenhoek, Malpighi, Descartes, Sylvius, Willis, Sydenham, Fabricus, LeClerc, and many other scientists. There came at this time a great change in the understanding of the physiology of generation; up to that time the Hippocratic concept had scarcely changed. With this new century came a sweeping away of the

old idea that hysteria, or suffocation of the uterus, was responsible for all types of female disorders.[15]

About 200 treatises were prepared on the anatomy of the female organs, some of them beautifully illustrated. By the middle of the century about 100 studies of the ovaries had been published.

Johannes van Horne, anatomist of Leyden, in 1622 coined the term "ovaries"; until then they had been called female testicles.[15] The first account of what came to be called the graafian follicles was given by Regnier de Graaf in 1672. With a few exceptions, his descriptions of the female genitalia remain accurate

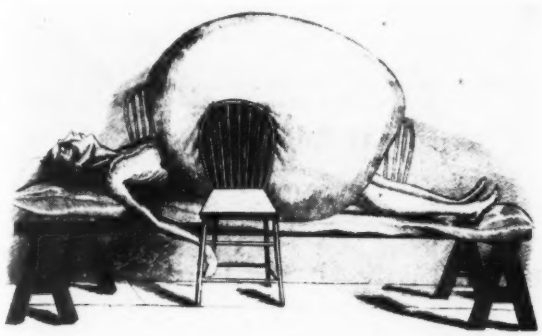

Fig. 4. Large unoperated ovarian cyst, postmortem in 45-year-old woman who had refused ovariotomy. The tumor had been growing for 10 years and had been tapped repeatedly. It was removed in order to get the body into a regular coffin; 2 gallons of fluid were withdrawn and about 2 gallons escaped; the tumor mass weighed 146 pounds (from L. A. Rodenstein, ref. 44).

today. The term "gynecology" was first used in 1640 by Johannes Lotichius. Tulp of Amsterdam in 1652 described cervical polyps and hypertrophied clitoris and made the earliest true notations on hydatiform moles; he was also first to illustrate a double ovarian cyst.

Indeed, the history of gynecology from this time on seems to be that of constant new discoveries or, in some instances, rediscoveries of facts long forgotten or discarded.

Rodericus à Castro in 1603 prepared a textbook in which he described excision of a gangrenous uterus. For excision of the clitoris the patient was placed on a stool and, while a strong-armed assistant held her steady, the surgeon in front of her exposed the parts with a speculum, grasped the hypertrophied part with a vulsella, and cut it off close to the teeth of the instrument. Then an astringent wine was applied to the bleeding surface and the part covered with a hemostatic powder and packs applied to promote scar formation. He also ligated a hypertrophied clitoris by tying it at its base with horsehair or silk thread dipped in aqua sublimate and tightening it daily.[15]

Van Roonhuyze[38] about midway of the century published his remarkable textbook on obstetrics and gynecology. Among his copper plate illustrations is a uterus containing a placenta and a fetus. He pointed out that prolapse of the uterus generally results from the inconsiderate grip of the midwife and not as generally believed, to hard labor, strong outcry, vehement coughing, straining at stool, falls, blows upon the belly, holding the breath, violent horseback riding, sneezing, dancing, leaping with outspread legs, or catching cold. He reported a case of prolapsed uterus repeatedly treated by midwives by use of cork pessaries dipped in wax. Finally a midwife was unable to remove a pessary which was wedged in. A "doctress" pulled it out piecemeal with her fingers. When the uterus became gangrenous, the woman told the husband to obtain strong urine from an old men's home and bathe his wife's body with it. Two more midwives failed to restore the uterus. When van Roonhuyze was called, he saw excision was demanded, and in the presence of two other physicians he drew down the prolapsed part, tied it with linen tape to prevent hemorrhage, and excised it with little bleeding. He applied proper dressings after cleansing with certain remedies "to prevent putrification and stench."[15]

Van Roonhuyze also attempted repair of vesicovaginal fistula. He exposed the fistula with a speculum, denuded the margins except for the bladder walls, then approximated the edges and stitched them with needles of swan's quills. He failed to state whether the patient lived. This preceded Sims' remarkable operation by 200 years.

The seventeenth century is also noted for the works of Paul Portal, Francoise Mauriceau, Johann Scultetus, and Frederik Ruysch.

Portal, a famous obstetrician, in 1685 gave the first detailed description of removal of a hydatid mole by insertion of a finger into the uterus. His book contains a fine illustration of the mole.[15] Mauriceau, with van Deventer, is said to have laid the groundwork of modern gynecology and obstetrics. His textbook of 1668 with its fine copper plates became a canon of that period.[22] He portrayed the external genital area, which he called the "shameful parts," showing the woman in lithotomy position. He apologized for the picture but considered it necessary for understanding the anatomy of the pelvic area.[15]

Scultetus[39] prepared the greatest book of illustrated gynecology and surgery and the instruments used. Published posthumously, in 1653, it went through eight editions during the seventeenth century and was revised in the eighteenth. Its fine copper plates show amputation of the breast and of the clitoris, insertion of the pessary for prolapsed uterus, and administration of a vaginal douche. There is also an illustration of what must have been a harrowing operation in preanesthesia days, amputation of the breast. Three coarse sutures were passed through the thickness of the breast for traction; then the breast was amputated with one stroke of the knife and the bleeding surface cauterized.

Conclusion

Thus briefly I have sketched the history of gynecology from about 2,000 years B.C. up to the eighteenth century. Seemingly so little was accomplished in that long stretch of years. Yet with little knowledge of the anatomy and physiology of the female organs, the medical man attempted much. Without asepsis, operative measures failed miserably; without anesthesia suffering was terrible; but always there was hope of curing and hope of being cured.

It is not possible, in this presentation, to cover the dramatic nineteenth century, the greatest century in the development of gynecology as a science. It is a stirring story of discoveries, of daring operations, of storms of opposition, and of gradual progress. The century opened with McDowell's[40] ovariotomy performed on the women he immortalized, Mrs. Crawford. Simpson[41] demonstrated Wells' technic. By the middle of the century ovariotomy was an accepted operation with its own kit of tools.[42] The profession was horrified by the "murderers" who dared hysterectomy, but operations continued and the technic was soon well worked out.[43,44]

Sims'[45] successful repair of a vesicovaginal fistula brought him the label of "humbug" and "quack," and the invention of the curet brought violent opposition.

As one writer[46] has said, we realize that gynecology of today is to a great extent a rediscovery of procedures which had been forgotten plus the addition of scientific knowledge of bacteriology, asepsis, and modern operative methods. Another interesting fact stands out when we look back over the history and development of gynecology. It is that progress in the treatment of gynecologic diseases has been made largely on a purely empirical basis, for the knowledge of the fundamental physiology of the female reproductive system has been gained only very recently, in spite of the interest manifested in the subject since the earliest recorded medical history.

We, as gynecologists, have come a long way, because of the daring of the pioneers in our field. At the hundredth celebration of McDowell's epoch-making operation, Hofmeier[47] said:

. . . when we review the past and see what difficulties and prejudices the best men of our profession had to contend with, and how many trifling details which we now know were quite unnecessary and unimportant were considered at different times of the greatest importance and indispensable to success, ought we not be modest in regard to our estimation of our present theories? For many of the things which we nowadays think absolutely necessary may be relegated to the lumber-room in the future, just as the spray has been, and in this connection the history of the first one hundred years of ovariotomy should be a useful lesson to us all.

Aveling[33] spoke of the rejection by the Royal Medical and Chirurgical Society of London of Blundell's paper of 1823; Blundell was far ahead of his time when he predicted safe invasion of the abdomen. Aveling pointed out that the occurrence was a lesson to individual workers not to be discouraged by opposition even from the highest quarters. It was encouragement to work on honestly and fearlessly, indifferent to ignorant and captious criticism, caring more for their own self-respect than the praise or blame of others. He stressed that such workers can always be confident that honest work must in the end make for the benefit of their fellow-creatures, whose health and happiness are the aim and end of all their labors.

Finally, we can say with Jenks,[3]

. . . the temple at which we figuratively worship has been principally in the hands of master workmen. Bunglers have sometimes marred its beauty and perhaps for a time have built unwisely; a wall has had to be pulled down here and another repaired there; delays have occurred and sometimes it has been partially destroyed, but the foundation has remained firm, and has continued to grow more and more perfect in structure. But the time of its completion we know not. We only know that the work of its construction will continue until the time the human race has arrived at that happy period, when there are no more lives to be saved, and no more suffering to be relieved.

113 W. Griggs Street

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The role of RADICAL surgery in CANCER of the female PELVIS

A. C. JOHNSON, D.O., F.A.C.O.S., F.A.C.O.O.G.
Detroit, Michigan

IN THIS PAPER I shall limit my discussion to malignant tumors affecting the organs of the reproductive system. Malignant growths affecting the rectum and bladder present all the dire complications which accompany similar tumors elsewhere. What is true of one is true of the other.

Radical surgery of pelvic carcinoma is closely bounded by three basic and fundamental facts:

1. The diagnosis must be comparatively early.
2. The patient must be carefully chosen.
3. The surgeon must be qualified.

If it were not for the fact that every soft tissue cell in the body is more or less in direct contact with the lymphatic and vascular drainage systems, surgical elimination of a malignant focus might be much simplified. But because of those drainage systems, the surgeon is unable to determine in most cases whether he is dealing with a sharply localized disease process or whether he is attempting the hopeless task of removing only a part of the process which has already sown its seeds into far distant organs. It is this frightening unknown that dictates the prognosis.

For purpose of illustration it may be said that all primary cancers begin as tiny nidi of anaplastic cells, which, for reasons unknown, become anarchistic. Anarchistic cells are always a menace to the life of the patient.

In the beginning these tiny groups of anaplastic cells are under control, strictly localized, and within bounds. These in situ clumps, if removed or completely destroyed, cannot thereafter menace the life of the patient. In other words, the cure of carcinoma in situ is a very simple matter. The great hazard of carcinoma in situ arises from the fact that it all too often remains undiscovered and progresses beyond the point of removal.

One should be able to visualize the anatomy of the pelvis, the most important structures of which are the lymphatic channels and nodes. Contemplation of these, and the physiology involved, should certainly dampen enthusiasm toward any attempt at radical surgery in late involvements of the pelvic organs in malignant processes.

The lymphatics of the uterus are contained in three main plexuses. The largest collecting channels are through the parametrium along the course of the uterine vessels. The drainage from the fundus of the uterus is outward through the broad ligaments, along with the ovarian lymphatics, to the periaortic nodes. Sometimes there are drainage channels along the inguinal ligaments to the femoral nodes. There are channels to the ureteral, lateral sacral, and promontory nodes. In carcinoma of the cervix these nodes may become involved early.

For the most part, lymphatic channels and nodes are in close relationship with the great blood vessels. All lymph eventually pours into the blood stream by way of the cisterna chyli and thoracic duct; this accounts for the tendency for metastases to lodge in the lungs.

Naturally, any radical surgery for pelvic cancer, in order to be definitely successful, must include removal of every lymph channel and node that might be harboring a metastatic cancer cell. This requires surgical dissection, which in some cases may be very formidable. And dissection necessitates careful search over a wide area. If involved lymph channels and nodes are not removed, the operation only delays the disease process, and in some cases hastens it.

More tragic are those cases in which the surgeon inadvertently dissects into an area which is so involved in cancerous process that he is obliged to cut through the mass. The operation might better be abandoned at this point if that is possible, for if dissection must pass through definitely cancerous tissue, the operation is worthless.

I realize that this complication cannot always be foreseen. But when the abdomen has been opened and the examination discloses "frozen" areas which cannot be cleanly removed, the surgeon has no moral right to begin a radical operation. A surgeon's remark, "I got most of it," when he knew in the beginning that he could not remove all of it, is self-incriminating and ridiculous.

The surgery of cancer is really specialty surgery. It differs from ordinary surgery in which the operation stays close to the pathologic lesion. In cancer surgery the surgeon attempts to work wide of the lesion.

In sarcomatous growths the prognosis is perhaps less hopeful than in carcinomatous. The metastasis of sarcoma is largely by way of the blood vessels. This is because of the close family relationship between the sarcoma cells and the endothelial cell lining of the blood tubules. Sarcoma cells meet little resistance from their brother cells as they seek to invade the vessels.

In cases of sarcomatous tissue, excision of involved blood vessels may be quite impossible without immediate danger to the patient's life. Such involved vessels may be filled with sarcoma cells, and embolic accidents and metastatic spread are prone to occur.

The diagnosis of pelvic cancer must be made early if a successful radical operation is to be performed. The great majority of pelvic carcinomas are of the squamous cell type, originating at the external os of the cervix where the squamous covering of the vaginal cervix meets the columnar cell lining of the endocervix. This is the critical area. Fortunately it is within easy view and is accessible.

The primary squamous cell carcinoma begins as a carcinoma in situ, and if discovered in this stage, it may be easily cured by removing the affected area in toto. Unfortunately the majority of patients do not present themselves until the carcinoma in situ has

broken out of bounds, or, if they do present themselves, the physician fails to recognize the disease.

Any suspicious area seen or palpated in the region of the external os should be considered potentially dangerous until proved otherwise. The first procedure is to obtain a Papanicolaou smear. The pathologist has little difficulty in sensing the presence of cells that hint of malignancy in these smears. If the smear is positive or suggestive, the suspected area should be cleanly removed by excision of a wedge of tissue for laboratory examination.

Indeed, when all women past the age of 35 submit themselves twice yearly for Papanicolaou smears, the incidence of inoperable uterine carcinoma will be materially reduced. Of course this program would not detect cancer which sometimes occurs in younger women. The latter should receive thorough investigation of the least vaginal complaint.

In adenocarcinoma of the endocervix and of the endometrium, the Papanicolaou smear is of great diagnostic value. Light curettage of the endocervix and submission of the obtained material to the laboratory should also prove diagnostic.

In a proved case of carcinoma of the cervix the surgeon's responsibility begins. Is the case sufficiently early to warrant radical surgery with a hope that cure will result? Of course, if the lesion proves to be carcinoma in situ, prompt total hysterectomy can be expected to cure the patient. If the malignant cells have broken through the basement membrane and are out of bounds, radical surgery comes under consideration. The surgeon must decide whether a radical operation promises more to the patient than does radium and x-ray therapy.

Some malignant growths metastasize very early, gaining access to lymph nodes at a distance. It is quite impossible to be certain of the operability of a given case by palpating the parametrium. In some cases, the thickened parametrium is quite free of metastatic cells while in other cases, normal appearing parametrium may contain many metastatic cells.

A uterus that is fixed or frozen must be considered beyond the help of the surgeon. A growth that has invaded the parametrium and the upper vagina may still be amenable to radical surgery, yet the chances for cure are much less.

Only by investigation of the pelvic organs from within the abdomen can a clearer picture be had. Such investigation must cover all the lymphatic channels that might possibly be involved. If the nodes in these areas are not enlarged and if there is no evidence of carcinomatous masses or thickenings outside the uterus and parametrium, radical surgery is probably quite in order.

The general physical condition of the patient is important. The mortality rate following radical surgery mounts rapidly in those above the age of 55 years. Short obese women are definitely bad risks. Only 10 to 15 per cent of patients with cancer of the pelvis are suitable for radical surgery. The others are too late.

As I have mentioned previously, radical surgery is extensive and hazardous. In the days of Wertheim the surgical mortality rate was about 40 per cent. In modern surgery, with its antibiotic support and with the aid of proper anesthesia, the mortality rate has been reduced to about 5 per cent. However, only 40 per cent of the patients who submit to radical surgery are alive after 5 years.

The greatest hazard in radical surgery for pelvic cancer is injury to the urinary system, especially to the ureters. The ureters are particularly exposed to danger where they pass through the parametrium. The ureters must be exposed in these areas, and the surrounding parametrial tissues must be removed. Injury here may necessitate reimplantation into the bladder. Among other injuries are division of a ureter, ureterovaginal fistula, and ureteral stenosis. Injuries to the bladder may result in atony and vesicovaginal fistula.

After many years of surgical experience I must confess that I am very pessimistic about any sort of treatment for deep-seated carcinoma which has advanced to the stage of metastasis. This feeling is not present when I consider skin cancers, very early cancers of the breast, and the low-grade breast cancers sometimes seen in the very aged, although even in the latter, if metastatic lesions are present, no cure can be had.

I have seen many patients wither and die under the best irradiation treatment. I have seen many patients in whom the cancerous disease has apparently been stimulated by surgical intervention. On the other hand, I have known patients to remain in good health for many years following irradiation and even after treatment by Percy cautery. However, these miraculous cases are greatly outnumbered by those patients who have steadily deteriorated and died within a year or two in spite of all efforts to save them.

I believe there is no answer to date to the question: What is the best treatment for deeply situated cancer? Intensive radium and x-ray treatment is considered a terrible ordeal by most patients. Many claim they would rather die of cancer than to be required to repeat such therapy.

It is also difficult to advise the patient who has moderately advanced cancer. Eventual death, barring miracles, is certain. Shall the patient be submitted to irradiation therapy with all its disagreeable effects, with little hope of cure, or shall she be permitted to die in what peace nature grants her? I do not know the answer.

It is my belief that radical surgery in properly chosen cases has an important place. It at least makes an attempt to eradicate the disease, and there is no doubt that such surgery sometimes cures and often prolongs life.

Whether irradiation should follow radical surgery is a moot question. Other than the misery caused by such therapy, there perhaps are no serious objections. On the other hand, irradiation therapy before radical surgery is not to be recommended. If more than a few months elapse after such therapy, the radical operation is much more difficult and hazardous because of the resulting fibrosis.

Summary

Early diagnosis of any malignant growth is of tremendous importance.

The Papanicolaou smear is a very valuable diagnostic aid.

Patients for radical surgery must be carefully chosen and the surgeon must be well qualified for such work.

Surgery is admissible in only 10 to 15 per cent of cases.

The surgical technic is difficult, and the operation is necessarily extensive. Only 40 per cent of the patients operated upon are alive after 5 years.

5435 Woodward Ave.

INFERTILITY

Its investigation and treatment

MAURICE C. KROPF, D.O.
Orrville, Ohio

A LITTLE APPRECIATED fact is that one in every ten marriages is barren.[1] The terms "infertility," "low fertility," "subfertility," "barren marriage," and "sterility" are used frequently in discussions of the subject. I prefer the word "infertility" since "sterility" seems so final, and the condition actually may only be temporary. Treatment of infertility requires a great deal of time and patience, but the physician who is able to treat this problem successfully renders a distinguished service.

Study of infertility has gone far beyond the thinking that the female partner is the cause of the barren marriage. Statistics reveal that the male is responsible in 40 per cent of infertile marriages; some factor occurs in one or both partners in 90 per cent; in 10 per cent of cases there are no objective findings.[2] It is important to impress upon couples seeking help that they should approach the solution to their problem as a single biologic unit, rather than to try to place the blame on one or the other.

The basic factors to consider in investigation of the problem of infertility are the following:

1. Male: The husband must produce a sufficient number of normal spermatozoa which, in a medium of favorable prostatic and vesicular secretions, must have accessible passageways to the outside.

2. Male and female: Spermatozoa must be deposited in the female in such a way that they reach and penetrate the cervical secretion and ascend through the uterus to the tube at the time in the cycle appropriate for fertilization of the ovum.

3. Female: The wife must produce normal fertilizable ova which must enter the tubes within a few hours and become fertilized. The resulting conceptus must move into the uterus and be implanted in an adequately developed endometrium and undergo development.

Investigation

The first essential is to establish a good patient-physician relationship. If the wife comes alone at the first visit, the general plan of investigation that is necessary should be explained to her and she should be urged to bring her husband to the next interview. She should be given an infertility questionnaire which she and her husband can fill in together before their joint interview. The questionnaire is valuable. It is an indicator of the thoroughness that is necessary for the investigation and is a valuable time saver.

The second interview is the joint interview, and with the questionnaire already properly filled in, the physician has the opportunity to discuss any part of the information it contains with the couple. From this information some conclusions can be drawn that will determine lines of investigation. From the questionnaire it will be determined if any further history is needed from either partner, alone or jointly. Some recommend that any further information be obtained from them separately.

The joint interview is the time to discuss frankly the probable length of time required for the examination and the expense involved. Surely there is no better way to establish a good patient relationship than to have a frank discussion at the beginning of the investigation of this very important and intimate problem.

First of all, a differential diagnosis must be made in order to establish the kind of treatment necessary. Impaired fertility is most often not due to a single cause but to a multiplicity of factors—systemic, local, nutritional, glandular, and emotional. These causes are interrelated: One factor cannot be considered without the others, and each case must be dealt with as a dual problem, but as a biologic unit formed by the male and female. It is better if the "blame" can be attributed to both partners rather than to only one. That way one partner cannot blame the other, and both will cooperate.

Although it is purely optional as to which partner should be examined first, I have found that a boon to the male ego and better cooperation results if the examination of the female is made first.

The Female.—

In the general examination of the female the physician should note the presence or history of any of the following which may be a factor in lowered fertility:[3] pulmonary tuberculosis, pneumonitis, malaria, diabetes mellitus, mumps, cryptogenic fevers, syphilis, nephrosis, hyperthyroidism, hypothyroidism, tuberculosis, nutritional deficiencies, neurasthenia, anxiety neuroses, and narcotic drug addiction. The presence of an osteopathic lesion should also be noted.

The local examination should determine the presence of any of the following factors which may be the cause of sterility:[3] cervical strictures, vaginismus, gonorrheal salpingitis, tuberculous salpingitis, tuberculous endometritis, pelvic inflammatory disease, ruptured appendix, endometriosis, deep cervical lacerations, tumors of uterus, previous abdominal surgery, too vigorous dilatation and curettage, congenital deformities of the genitalia, anovulatory menses, overexposure to x-rays, and prolonged exposure to lead or mercury.

The vaginal examination should also include testing the hydrogen ion concentration of the vagina; normally this is 4 to 5; that of the cervical canal is 7 to 7.5.[3]

A routine hanging drop culture is taken to learn if Trichomonas and monilia are present. The cervix is studied to determine the presence of endocervicitis, ectropion, entropion, cervicitis, prolapsing fibroids, and polyps. The canal should be probed for strictures.

The size, shape, and consistency of the uterus must be evaluated. The position of the uterus may be a factor in sterility although it is not believed to be an important one. Sometimes pregnancy does follow replacement of a retrodisplaced uterus; however, improvement of circulation and resultant healthier and normal tissue may be the reason rather than the actual mechanics involved.

Often in sterility cases the uterus is hypoplastic, usually as a result of an endocrine deficiency. This may

indicate a general systemic underdevelopment that has existed since puberty.

Fibroids of the uterus are many times responsible for sterility; in those cases myomectomy is necessary before conception can occur. Congenital anomalies of the uterus which may be the cause of sterility can easily be mistaken for fibroids. Hysterography will establish diagnosis. Adhesions and endometriosis may cause infertility, producing an actual mechanical block.

Ovarian dysfunction contributes much to infertility and is responsible for many early abortions. Careful study of endometrial tissue of patients prone to infertility or abortion shows the need of hormonal therapy to improve the endometrium. Three conditions are mentioned by Frost[4] which may cause sterility as a result of failure of good ovarian function: (1) anovulation without corpus luteum formation (true anovulatory bleeding), (2) anovulation with subsequent corpus lutem formation (luteinization of the eggless follicle), and (3) ovulation without subsequent corpus luteum formation (postovulatory secretory arrest).

Certain tests are valuable in establishing the cause of infertility. They include:

Tubal insufflation: This is best done just before midcycle. The condition of the pelvis should be ascertained before this test is performed. The history and previous examination should reveal whether there is any contraindication to the procedure.

Endometrial Biopsy:

This procedure is essential, for the results reveal if the patient is ovulating and also the maturation of the endometrium (its secretory activity). The best time to perform endometrial biopsy is within 12 hours of the onset of menstruation or 2 to 4 days before the estimated onset; that is, 10 to 12 days following the consistent basal body temperature rise after the midcycle dip.

I prefer the Novak curet for removal of tissue. A strip of endometrium is picked up, blown out of the curet with a syringe, and placed in a fixative. The test is repeated in three different cycles (in conjunction with basal temperature curves) if at the first biopsy the endometrium is found to be anovulatory. It is well known that some women experience an occasional anovulatory cycle.

Temperature Graphs:

Regular recording of temperature aids greatly in differential diagnosis. An atypical curve may indicate defective hormone function. With this method the cycle can be established and the best time for intercourse advised. Establishment of the probable ovulation time should be accomplished within 4 months. Although ovulation usually occurs between the eleventh and fourteenth days of the menstrual cycle, it may occur at any time.

Failure to conceive may be due to wrong timing of coitus in relation to the time of ovulation. It is therefore important to vary the time of coitus in different cycles. However, even though temperature graphs are helpful in some cases, it is important that the patient not become a slave to the thermometer.

The Huhner Test:

From this test it can be learned if the male is able to deposit sperm in sufficient quantity in the vagina and if the vaginal and cervical secretions are receptive to the sperm so that their motility is retained long enough for conception to occur. The test is interpreted according to the number of sperm per high power field in relation to the time which has elapsed since coitus; that is, 5 to 20 plus per high power field with 50 per cent active at 4 hours and 25 per cent active at 12 hours is considered compatible with ability to fertilize.

Recent investigation has disclosed that the number of sperm in the cervical canal is of more importance than the number found in the posterior fornix.

Uterosalpingography:

If the first two tubal insufflation tests indicate occlusion, uterosalpingography should be performed in order to determine the point of tubal obstruction. The procedure should be performed immediately before the midcycle. Occlusion at the fimbriated end has a better prognosis than its occurrence at the isthmic end.

Positive diagnosis of tubal occlusion should not be made until after a uterosalpingography has been performed a second time. In infertility cases, this diagnostic method may also be therapeutic. In some patients pressure of oil has apparently opened occluded tubes, the tubes being patent upon re-examination.

Pregnanediol Excretion: Since pregnanediol appears in the urine soon after ovulation, its presence indicates a functioning corpus luteum which is secreting progesterone. Briefly, several 12-hour urine specimens collected after the twentieth day of the cycle are necessary for estimation of pregnanediol.

The Male.—

The objective survey of the male may give information which is valuable in determining the cause of infertility. Is he a big virile man, or does he possess feminine characteristics such as scanty beard, wide hips, and breast enlargement? Are marked characteristics present which point to endocrinopathies? Much can be learned from his handshake. In short, it is just as necessary for the physician to use all his powers of observation in infertility problems as it is in any other diagnostic problem.

From the infertility questionnaire which was given to the wife at the first interview can be learned the pertinent things about his history. At the time of his examination, the history can be enlarged upon. The physician should inquire thoroughly. The husband's story should be checked against the wife's.

In the general examination the physician should look for and inquire about conditions which may be responsible for lowered fertility such as pulmonary tuberculosis, tuberculosis of genitals, physical and mental exhaustion with weakening libido, excessive use of alcohol and tobacco, dietary deficiencies, ineffective sexual technic, impotence, premature ejaculation, sexual perversions, neurasthenia, anxiety neuroses, narcotic drug addiction, diabetes mellitus, mumps, syphilis, and gonorrhea and its sequelae.[3]

In the local physical examination evidence of the following should be looked for: syphilis, atrophied testes, herniorrhaphy and its possible effect on the spermatic cord, prostatic abscess, injury to verumontanum, hydrocele with epididymitis, surgical procedures for urethral strictures, trauma to the testes, overexposure to x-rays, varicocele with soft testicle, undescended testes, hypospadias or epispadias, epididymitis—tuberculous or gonorrheal, occlusion of vas deferens, and torsion of testes with hemorrhage.[3]

Fibrosis of the corpora cavernosum may cause chordee and make coitus too painful or impossible. Rectal examination of the prostate and seminal vesicles may reveal residual inflammation as shown by enlargement and tenderness; pus cells will be evident at microscopic examination of secretion.

The possibility of an osteopathic lesion or of a con-

genital defect of the spine that produces a herniated disk syndrome must not be overlooked.

Several tests are also used in determining the fertility index of the male:

Examination of the Semen: In the male, this is the most important test. Diagnosis should not be made on the basis of one examination of semen; the quantity and quality of semen may differ, and more than one specimen should be evaluated.

Routine Laboratory Tests: A complete blood count should be made, and the Rh factor should be determined. The basal metabolic rate, erythrocyte sedimentation rate, and blood cholesterol level should be determined. A complete urinalysis and the two-glass urine test should be performed. Centrifuged urine should be examined for the presence of Trichomonas and yeast.

Treatment

Following painstaking investigation and accurate differential diagnosis, treatment will depend on the etiologic factors and will be surgical or endocrine or both. In addition, measures should be taken to build up the general health of the patients. The fact that the couple has come for treatment is, in itself, an aid to overcoming infertility, since it indicates that the two are receptive to suggestions. Periods of abstinence from the sexual act may improve spermatogenesis so that conception results.

The Female.—

An imperforate hymen must of course be resected. Vaginismus resulting from dyspareunia due to any lesion of the genital tract requires removal of the cause. Congenital vaginal defects require plastic surgery.

Cervical lesions usually are multiple, but some are amenable to treatment by simple cauterization or conization. In some cases dilatation for stricture or curettage for polyps is necessary.

In other cases simple procedures are not sufficient. Ectropion, which is often the cause of one- and two-child sterility, may require trachelorrhaphy. Opinion is divided on performance of trachelorrhaphy in such cases, however. Although it has been the belief that pregnancy and normal labor cannot follow this operation, Solomon[5] has presented evidence to the contrary based on data from 540 of 720 patients who underwent surgery.

Conditions which required surgical treatment were leukorrhea (the predominant symptom, cure of which follows removal of erosions or other abnormality and relieves sterility), one-child sterility, cervical erosion, ectropion, and hypertrophy with or without prolapse of the uterus. Of the 540 patients on whom data were collected, 221 (about 41 per cent) became pregnant. Of the total number who became pregnant, 18 had miscarriages; of these, 4 operations had been performed for prolapse, 9 were circular amputations, and 5 were Schroeder operations. Of the total who later became pregnant, trachelorrhaphy was performed in 134, Schroeder operation in 45, circular amputation in 34, and surgery for prolapse in 8. None of the patients experienced difficulty in labor.

These results seem to indicate that when cure by cauterization is uncertain, careful surgery relieves sterility and results in no difficulties in delivery. In addition, since pathological cervical processes predispose to cancer, it is believed that the number of trachelorrhaphy and amputation operations performed in Ireland has contributed to the low incidence of cervical cancer in that country.

Care of cervical conditions results in better reception for the sperm. Penetration of sperm through healthy mucus is easier than through mucus secreted by a diseased cervix or uterus.

Dilatation and curettage should be performed in cases of chronic endometritis in order to remove the hyperplastic layer.

Uterine fibroids can at times be resected. The physician should not make haste to remove a fibrotic uterus from a young woman or a woman who desires more children. First, hysterography should be performed in order to determine the capacity of the uterus for carrying a pregnancy to term. Submucous fibroid is more often the cause of abortion than is myoma.

Malpositions of the uterus, particularly retroversion and prolapse, should be corrected. Pregnancy frequently follows.

The site of obstruction of blocked tubes is best determined by salpingography. Surgical removal of the obstruction is indicated in combination with a plastic operation.

Endometriosis which is causing infertility should be treated as radically as necessary, but reproductive function should be preserved.

Following thyroid therapy, Frost[4] has noted improvement in the endometrial tissue and noticeably improved regularity in the menstrual cycle. Estrogenic hormones are used in treating the hypoplasia. Estrogen is used in the first part of the cycle and progesterone in the latter half. In a short cycle, progesterone therapy is started as early as the ninth or tenth day. In patients with secretory arrest and short cycles, progesterone alone was given in large doses. Improvement can be proved by means of the basal body temperature charts and endometrial biopsy.

Thyroid is administered to patients whose basal metabolic rate is less than 0. It is given to its full therapeutic effect.

The Male.—

The male does not offer as many surgical approaches to the problem of infertility as does the female. If orchiopexy is to be effective in later life, it should be done before puberty. Strictures of the scrotal portion of the vas deferens are treated by resection and end-to-end anastomosis. Occlusion of the ejaculatory ducts by strictures may occasionally be treated by dilatation with an endoscope. The most frequent cause of obstructive sterility in the male is bilateral epididymitis which is best treated by vasoepididymostomy, but only 10 per cent of these procedures are successful.[3]

Cryptorchism causes degeneration of the testicle due to pressure and to the higher body temperature. The use of chorionic gonadotropic hormone between the ages of 4 and 5 years results in some improvement. The dosage is 250 to 500 international units two times weekly for 6 weeks. If no improvement occurs, this should be abandoned and surgery performed at this age before damage occurs to the testicle.

Mumps convalescent serum is useful. Stilbestrol in a dose of 1 mg. three or four times daily for 7 days is effective in preventing orchitis. The infertile male patient should not work in occupations in which he is constantly exposed to high temperatures. Wearing of jockey shorts acts much like cryptorchism in that the testicles are kept too high and too warm, thus preventing proper spermatogenesis.

The use of testosterone has merit in improving the status of males who are found to be subfertile on the

basis of poor sperm counts. Depot testosterone is used, the theory being that with the cessation of treatment there is improvement in the condition. Testosterone implants are also used. Extreme asthenospermia and oligospermia were invariably unaffected by implants according to Swyer.[6] It is suggested that moderate deficiency in the number of sperm (15 to 20 million per cc. of poor motility—other than extreme asthenospermia) with fair or good density offers the best chances of improvement after implantation with testosterone; amounts of 200 or 300 mg. are used. In Swyer's series the wives of twenty men became pregnant (twenty-two pregnancies), all within 6 months of the implantation; five pregnancies ended in abortion, the rest went to term.

In the male, also, hyperthyroidism and hypothyroidism should be treated.

Summary

Male and female responsibility for infertility is about evenly divided.

In the investigation of their infertility, the couple should be considered as a biologic unit rather than as two separate individuals.

A complete physical examination and a thorough investigation of both partners are essential.

Certain specific tests are necessary in an effort to elicit the etiologic factors.

Treatment depends on the causative factors and, aside from general measures, will be surgical, endocrine, or both.

217 N. Vine St.

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An EVALUATION of the procedure of trial forceps

CARL WATERBURY, D.O.
Chairman, Department of Obstetrics
Des Moines Still College of Osteopathy and Surgery
Des Moines, Iowa

THE PURPOSE of this article is to define and to some extent evaluate the concept of trial forceps. Because of the controversial nature of this procedure, and because there is no clear-cut definition of it in the literature, the term "trial forceps" will be used in this paper to refer to the procedure of making a cephalic application of forceps in the midpelvis or a lower plane, following which trial traction is applied in an attempt to accomplish vaginal delivery without injuring the mother or the fetus. It must also be understood that trial forceps procedures imply that in some instances a failure of forceps will be encountered and, therefore, this paper must necessarily attempt to evaluate the procedures which can best correct the failure. It can be said, then, that trial forceps is an extension of the philosophy of trial labor and must not be confused with test of forceps any more than test of labor is to be confused with trial labor.

Source of material

The material used in this article is derived primarily from recent literature appearing in accepted medical journals. In addition, several obstetric authorities were contacted by letter, and their opinions are also given.

It is immediately apparent to anyone searching the literature that there is a wide difference of opinion and statistics concerning midforceps operations in general. An example of this wide variation is seen in the opinions and statistics expressed by Steer[1] and by Weinberg.[2] Steer has shown that midforceps operations per se resulted in a fetal mortality of 4 per cent as opposed to 0.1 per cent for cesarean section in the group of women studied. Furthermore, the incidence of further childbearing in this group was markedly reduced in the women who had had previous midforceps deliveries. Weinberg, on the other hand, in a group of 1,000 midforceps deliveries had a corrected fetal mortality rate of 0.5 per cent. In Steer's group there was one maternal death in 227 midforceps deliveries. In Weinberg's group there were no maternal deaths.

One other point of major significance is that until quite recently, most studies of failed forceps showed that the final method of delivery was other than cesarean section. This is borne out in studies by Eadie and Keettel,[3] Law,[4] and Gadd.[5] These men also show that the high fetal death rates resulting from the failure of forceps delivery is due primarily to malposition of the head, undilated cervix, and fetal disproportion. It may be logical, therefore, to say that whenever failure of forceps is corrected by timely and properly performed cesarean section, fetal mortalities are greatly reduced. This opinion is strongly upheld by Weinberg[6] and Randall.[7]

Prerequisites and technic

The technic of trial forceps is that of any midforceps operation to which is added the extra caution and gentleness of an operator who understands the significance of the term "trial." The procedure is justifiable only in a hospital with adequate obstetric and surgical facilities.

The patient must be delivered on a split table, never a full table, in the lithotomy position, thighs well apart and flexed. In my opinion, a complete manual examination before application of forceps is mandatory in order to determine fetal position and to acquaint the

operator with the architecture of the pelvis. Many catastrophes can be avoided if this is done. A cephalic application of forceps is always made, followed by rotation if necessary. Any forceps can be used. In our hospital, preference is given to the Luikart-McLean forceps, but probably the instrument of choice is the one with which the operator has the greatest skill. Following application, gentle traction is effected, with a traction handle if desired. This traction may be accompanied by moderate abdominal pressure by an assistant. Traction must be interrupted frequently to determine the degree of descent and effect on the fetus. The obvious danger here is that the inexperienced operator will give up too quickly,[7] while the overconfident physician may convert the procedure into a test of strength. An available operating room should be held in readiness so that in the event of failure, the least possible time will be lost before cesarean section can be done. The method of choice for correction is cesarean section,[3, 6-8] either extraperitoneal or low cervical. Classical cesarean section is contraindicated.[7]

The anesthesia of choice for trial forceps is some form of conduction anesthesia; caudal, epidural, and saddle block are all satisfactory.[4-7] This method of anesthesia causes the least fetal distress. Also, if the attempt at vaginal delivery fails, the patient is able to undergo immediate cesarean section with little or no additional anesthetic agents being used. Inhalation anesthetics are contraindicated because of the obvious effect of long administration on the fetus, which has already been subjected to the rigors of a forceps delivery which has failed. My own procedure is to use a low subarachnoid block after dilatation has occurred. If caudal anesthesia is used during the first stage of labor when trial forceps is anticipated, the incidence of transverse arrest and persistent occiput posterior is greatly increased owing to the loss of pelvic soft tissue tone which if undisturbed might have brought about spontaneous rotation.[5] DeCarle[8] considers spinal block the anesthetic of choice for cesarean section. The following two case histories point out the differences between conduction of labor when caudal anesthesia has been used too soon and when it is withheld until the proper time.

Case 1. A 23-year-old white primigravida, weight 128 pounds, height 5 feet 4 inches, was admitted to the hospital in labor which had already lasted 5 hours. She was 3 weeks past the estimated date of confinement. Two days previous to this admission she had been hospitalized for 24 hours during which time induction of labor was attempted with 1:1,000 solution of intravenous Pitocin. The attempt was unsuccessful, and she was dismissed.

At the time of the second admission, the head was well within the inlet, the vertex being at station zero. She was having moderate pains at 5-minute intervals. The cervix was dilated 2 cm. and uneffaced. The membranes had ruptured prior to admission. The fetal position was right occiput posterior. X-ray pelvimetry showed this patient to have a moderately large gynecoid pelvis with all planes showing adequate measurements and that the head was engaged in a right occiput posterior position (Figs. 1 and 2).

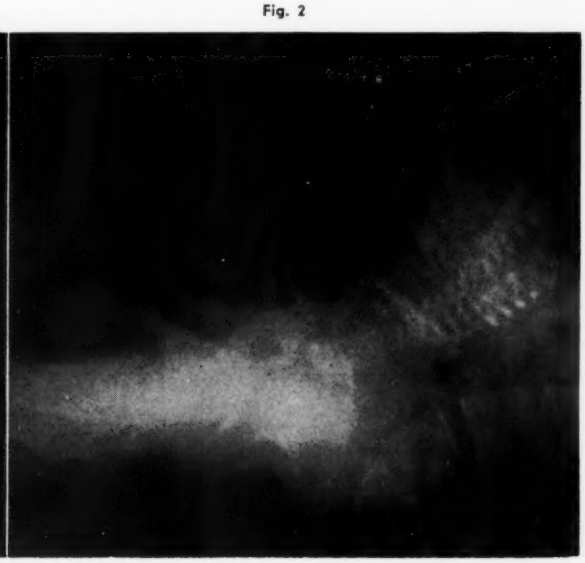
Caudal anesthesia was started about 2 hours after admission with the cervix partially effaced and dilated to 4 cm. The cervix remained relatively "tough" or "unripe." After 10 hours of labor under caudal anesthesia, the cervix had dilated to 8 cm., but the head had not descended past the midpelvis. The head continued in a persistent occiput posterior. Because of an elevated fetal heart rate, the patient was taken to the delivery room and dilatation was completed manually. A forceps delivery was attempted with the head still in the posterior occiput position, but moderate traction failed to cause appreciable descent. Because of rapidly increasing fetal distress, forceps rotation and extraction were performed; the head delivered as a right occiput anterior. The infant required strenuous rescusitation measures before regular respiration occurred. The birth weight was 8 pounds, 1½ ounces.

As a result of this forceps operation, the patient suffered two cervical lacerations, a large vaginal laceration, and wide episiotomy; blood loss was estimated at about 500 cc. She required transfusion in the immediate postpartem period, and her stay in the hospital, while not markedly stormy, was lengthened by 2 days.

Case 2. A white primigravida, 19 years of age, height 5 feet 2 inches, weight 160 pounds, was admitted to the hospital with moderate pains lasting 45 seconds at 5-minute intervals. She had been in labor for 6 hours. The cervix was effaced and dilated about 3 cm., but the head was at station –2 and entering the

Fig. 1

Fig. 2



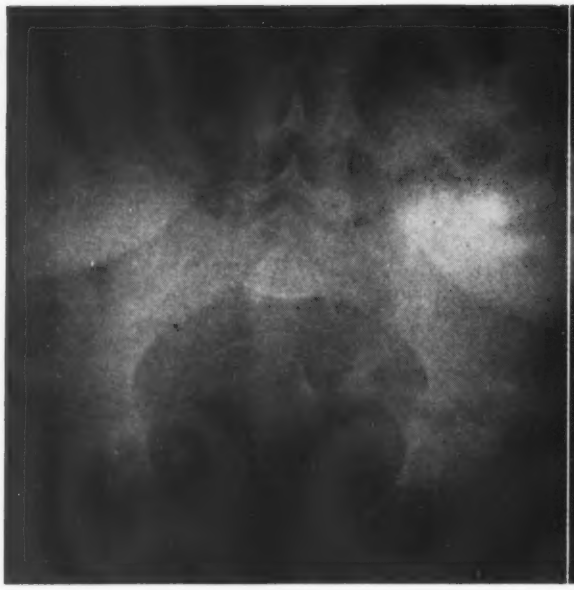


Fig. 3

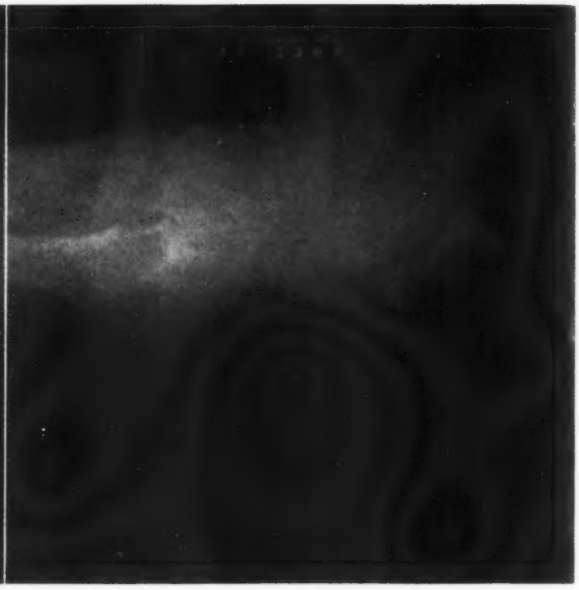


Fig. 4

pelvis as a left occiput transverse presentation. X-ray pelvimetry showed this patient to have a platypelloid-gynecoid pelvis with diminished anteroposterior diameters. Although the transverse diameters were adequate, some difficulty was anticipated (Figs. 3 and 4).

She labored for 10 hours without making much progress, but in the next hour the head descended to the midpelvis and the cervix dilated rapidly. Caudal anesthesia was started and, by means of a low forceps extraction, the baby was delivered 1½ hours later in a left occiput anterior position. The baby weighed 6 pounds, 6¾ ounces. The puerperium was uneventful.

These cases are cited as examples of the effect the timing of the administration of caudal anesthesia has on spontaneous rotation of the head. In the first case, an adequate bony pelvis was not enough to counteract the adverse effects of the cervical dystocia, which had not been fully appreciated, and the persistent posterior occiput. This resulted in a traumatic midpelvic forceps operation. In the second case, the diminished anteroposterior diameters of the pelvis caused little trouble other than a lengthened first stage of labor, because dilatation and descent occurred before caudal anesthesia was instituted, and spontaneous rotation of the head was not disturbed.

Probably the most important prerequisite for a trial forceps procedure is adequate x-ray evaluation of the pelvis. This will allow the obstetrician to measure accurately the diameter of the pelvic planes and estimate the pelvic capacity. Weinberg[6] recommends a technic making use of the procedures outlined by Mengert[9] and one which he himself has devised. Any acceptable technic such as the Snow or Colcher-Sussman may be utilized. Midpelvic forceps applications should never be attempted if true dystocia exists.

Other prerequisites of importance are prophylactic fortification with antibiotics. Randall[7] recommends the simultaneous use of two. In our hospital, we routinely use penicillin and streptomycin. Also, the patient's blood should be typed and crossmatched before she is taken to the delivery room, and adequate amounts of blood should be held in readiness.

Indications and contraindications

Trial forceps is indicated in any case in which the second stage of labor has been stopped or appreciably slowed, providing the prerequisites have been met and the experience of the physician warrants its use. It will usually be of value when transverse position of the head and persistent posterior occiput have interfered with normal descent. Furthermore, it is essentially a procedure carried out in the midpelvis or possibly a lower plane in a few instances. Primarily, it is a procedure by which the incidence of cesarean section can be materially reduced, without increasing the incidence of fetal and maternal mortality and morbidity. Weinberg[6] points out that 97½ per cent of all midforceps operations are performed for indications other than contracted pelvis or disproportion. It is his view that the mortality and morbidity rates accompanying properly carried out trial forceps procedures should approximate those of low forceps delivery.

The contraindications for trial forceps are very clear-cut:

1. True pelvic dystocia and/or disproportion.
2. Undilated cervix.
3. Some cases of abruptio placentae and placenta previa.
4. Unengaged head—the procedure should never be attempted at a plane higher than the midpelvis, regardless of dilatation.
5. Dead fetus.
6. Length of labor in excess of 48 hours.
7. Some cases of fetal distress, especially those in which the time consumed in attempting forceps delivery would prove fatal in case of failure.
8. Inexperienced operator.
9. Small hospitals where the prerequisite facilities are not available.

Summary and conclusion

I have attempted to correlate some of the present day philosophies concerning the technic of trial forceps.

I think it can safely be said that a modern concept of midpelvic forceps operations which makes use of the principle of trial, and which is followed, in the event of failure, by cesarean section, properly performed, will appreciably reduce the incidence of elective cesarean section without increasing maternal and fetal mortality.

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INVESTIGATIONS

into the etiology

of pregnancy

TOXEMIA

JULIAN LANSING MINES, D.O., F.A.C.O.O.G.
Associate Professor of Obstetrics
College of Osteopathic Physicians and Surgeons
Los Angeles, Calif.

IN THIS COUNTRY ALONE, over 1,000 mothers lose their lives each year as a result of toxemia associated with pregnancy. Of equal concern to us should be the loss of fetal life caused by this same malady. Fetal and neonatal deaths considered to be a direct result of toxemia total some 30,000 annually in the United States.[1] Of course, there can be no accurate estimate made of the morbidity associated with pregnancy toxemia, but it would seem logical to assume that many mothers and offspring surviving toxemia are not as healthy as they might have been had they not been subjected to the damages inflicted by this potential killer.

Purpose

It is the purpose of this paper to report on recent investigations into the etiology of toxemia associated with pregnancy and to indicate new directions which researchers might follow in order to add to the pitifully small amount of accumulated scientific data dealing with the causes and prevention of this condition.

Early and current investigations

Unfortunately, many efforts directed toward the prevention and active treatment of this condition have been based on information compiled by clinicians many years ago. It is distressing that most therapy has been symptomatic, an approach long frowned upon by the osteopathic segment of the medical profession. It is fortunate that investigators in the fields of the basic sciences have pointed the way, many times over, to the solution of medical problems. If the wealth of basic information available is considered, there are new directions which may be taken to clarify the etiology and dictate the treatment to be used in the future.

Recent experimental evidence tends to indicate that faulty nutrition can produce liver damage, renal insufficiency, and atherosclerosis. Keys,[2] Gofman and his associates,[3] and Gertler and Garn,[4] in their studies of atherosclerosis, emphasize the roles played by lipids and lipoproteins in its production. Peters and Man[5] have suggested that the ratio of the serum lipids to each other is more important than the consideration of a single lipid, and that serum phospholipids exert a protective action as colloid stabilizers in experimentally produced atherosclerosis. This serves to strengthen Browder's[6] earlier observation of the antagonism existing between serum cholesterol and serum phospholipids in biologic reaction.

Since vascular changes, such as endarteritis and atherosclerosis, are commonly seen in the liver and placenta of the toxic obstetric patient and since renal ischemia is usually present, and in view of the fact that a high blood cholesterol level is the rule, might not the toxemias of pregnancy be the results of metabolic disorders rather than of exogenous infections or a placental or fetal toxin?

Currently, a research project sponsored by the American College of Osteopathic Obstetricians and Gynecologists is being conducted by some of its members to determine the cholesterol-phospholipid ratio in both toxic and nontoxic obstetric patients. If the phospholipid rise does not keep pace with the cholesterol level found in toxic patients, and if it does in nontoxic patients, it may indicate that colloid stabilizers in the form of phospholipids are not present in sufficient amounts to prevent vascular changes in the toxic patient.

Materials and methods

A careful selection of patients is being made from varied income and social groups in order to balance the results obtained. The patients are being grouped into three categories;

1. Those whose family history indicates multiple occurrences of any one or more of the following: cardiovascular accidents, coronary artery disease, diabetes, renal disease, pregnancy toxemia, and severe metabolic disturbances. This group also includes patients whose personal history indicates the occurrence of pregnancy toxemia during a previous confinement.

2. Those patients seen late in pregnancy who demonstrate severe eclampsia, eclampsism, or premature separation of the placenta with extensive chorionic infarction.

3. Those patients with negative histories concerning the above findings whose pregnancy course is well within normal standards.

Serial tests to indicate the blood cholesterol-phospholipid ratios are being taken during pregnancy, and attention is directed toward the ratio variations rather than toward the levels of either substance itself. All tests will be done by the same two laboratory technicians throughout the series in order to minimize the differential that might occur with many participants.

Conclusions

If a correlation can be made between the behavior of the cholesterol-phospholipid ratios of the toxic patient and those ratios found in young adults suffering coronary disease and diabetes, as illustrated in the research of Gertler and Garn[4] and numerous other investigators, a vast new horizon will challenge the researcher interested in the solution of the problem of pregnancy toxemia. If the precursors necessary to produce toxemia fall into the field of nutrition, as deficiencies of lipotrophic elements and methyl- and sulfhydryl-containing substances, the corrective measures to be taken must be based on a fuller understanding of the nutritional needs of these individuals.

A great amount of work has been done on the subject of cholesterol metabolism, and confusion exists today as to whether low cholesterol diets are of value in the treatment of conditions demonstrating atherosclerotic changes. Low cholesterol diets prove to be deficient in methyl donors, and by limiting one substance, a new deficiency is created. Methylating agents, such as methionine, choline, and betaine, are of extreme importance to the body, both for the production of essential body constituents and for detoxification processes. In addition, methyl groups play an important role in cholesterol metabolism.

Detoxification implies a neutralizing action of the toxins of the body. For practical purposes they can be divided into two groups, the external, such as amines often spoken of as ptomaines, and the internal group derived from inadequate oxidation, suboxidation, or submethylation.

In addition to methyl donors, it is important to supply adequate amounts of sulfhydryl-containing substances, as cell respiration, antitoxin formation, and detoxification in general are dependent to some degree on sulfhydryl groups.

At the present time there is much information available concerning substances which contain sulfhydryl compounds and methyl donors. If recent experimental efforts indicate that the etiology of pregnancy toxemia is linked to deficiencies of these compounds, the prevention of this condition should not be too difficult.

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The 1957 meeting of the College

The Twenty-Fourth Annual Convention of the American College of Osteopathic Obstetricians and Gynecologists is to be held in Philadelphia, Pennsylvania, at the Bellevue-Stratford Hotel, February 18-20, 1957.

The last meeting of the College in Philadelphia was held in June, 1941. About fifteen members attended a 1-day program, and there was a radio broadcast from Station WCAU—the college was a small organization 15 years ago. Today the City of Philadelphia presents many changes from those prewar days; the Convention hotel is completely modernized; the Market Street elevated lines have been removed; and the old railroad wall in the center of town has been replaced by a modern transportation and office building. Today the College presents comparable changes, and the attendance at the forthcoming meeting is expected to be more than ten times that of the previous meeting in Philadelphia.

The membership roll constantly enlarges as the stature of the College increases in the professional community. Unremitting attention to standards of sound obstetric and gynecologic practice is only one of the permanent basic problems before College members, but it is an important one. The fact that recent statistics on maternal mortality compiled from the practice of osteopathic physicians show that their rates are lower or no higher than the national over-all figures demonstrate that standards are being met.

The professional program was completed in 1 day in 1945; the program for 1957 will last 3 days and will be followed by a graduate course in obstetrics and gynecology offered by the Graduate School of the Philadelphia College of Osteopathy. Often unappreciated by the general membership is the role of the first and second vice presidents in arranging and carrying out plans for the national meeting of the College. At the 1957 annual meeting, the program will unquestionably reflect the untiring efforts and capable planning of this year's vice presidents, and it is hoped that appreciation will be demonstrated by a large attendance.

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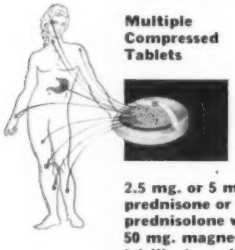

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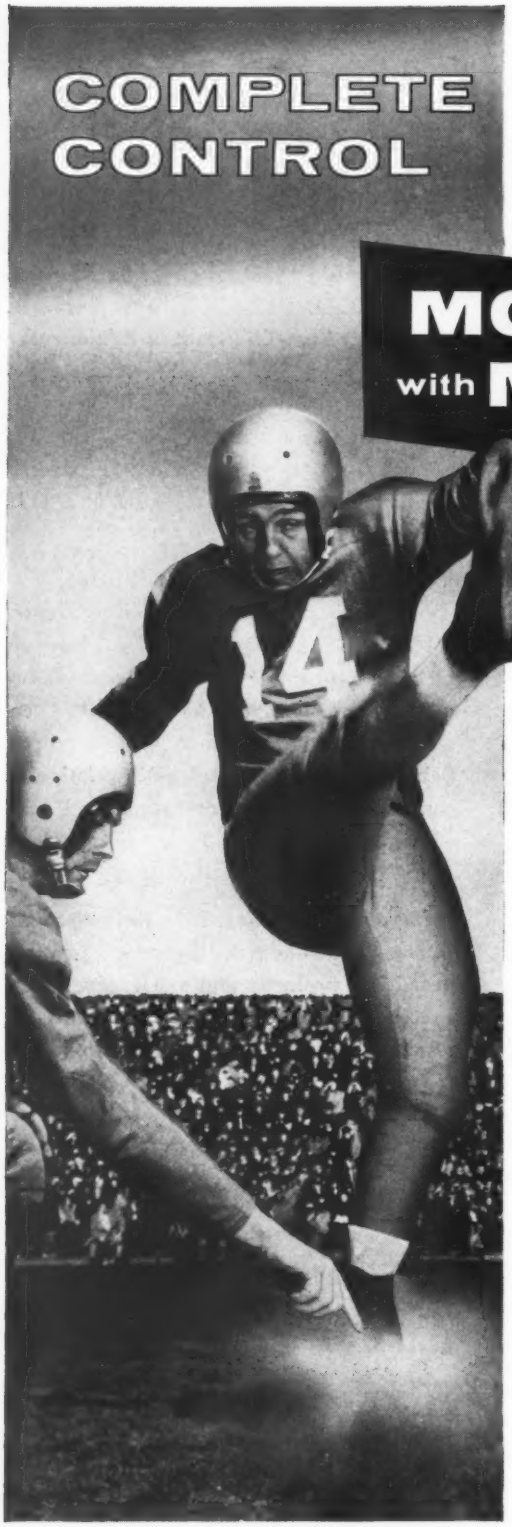

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She can reconstitute it for drinking, and enjoy delicious fresh-milk flavor with all milk's protein, calcium, and B-vitamins—but only half the calories of whole milk. She can use *Instant* Pet, in either liquid or dry form, to cut calories in cooking. And the addition of extra *Instant* Pet, in dry form, to some of her favorite dishes can greatly increase needed calcium and protein intake without appreciably increasing calories.

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The material on gynecologic problems in children, diarrhea, and gastro-intestinal disorders, the section on allergies and the section devoted to neurologic conditions are particularly complete and contain the very latest information on these important topics. The very difficult problem of counseling parents of the abnormal child is also thoroughly covered. Considerable attention is given to orthopedic and eye conditions, and to treatment of dehydration and electrolyte disturbances.

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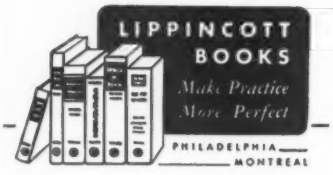

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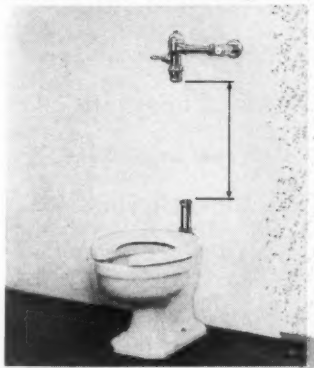

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Conventions and meetings

Announcements

American Osteopathic Association, Sixty-First Annual Convention, Hotels Adolphus, Baker, and Statler, Dallas, Texas, July 15-19. Program Chairman, Neil R. Kitchen, 18820 Woodward Ave., Detroit.

American College of Osteopathic Obstetricians and Gynecologists, annual meeting, Bellevue-Stratford Hotel, Philadelphia, February 18-20. Program Chairman, P. J. MacGregor, Jr., 706 J. M. S. Bldg., South Bend 1, Ind. Secretary, Harold K. Morgan, Lakewood Polyclinic, 7575 W. 14th Ave., Denver 15.

American College of Osteopathic Surgeons, annual meeting, Sheraton-Cadillac Hotel, Detroit, October 28-November 1. Program Chairman, Don E. Ranney, 793 N. Renaud, Grosse Pointe Woods 36, Mich. Secretary, Orel F. Martin, Box 474, Coral Gables 34, Fla.

American Osteopathic Academy of Orthopedics, annual meeting, Sheraton-Cadillac Hotel, Detroit, October 28-November 1. Program Chairman, Jack M. Wright, 1618 Broadway Ave., Toledo 9, Ohio. Secretary, J. Paul Leonard, 2673 W. Grand Blvd., Detroit 8.

American Osteopathic College of Anesthesiologists, annual meeting, Sheraton-Cadillac Hotel, Detroit, October 28-November 1. Program Chairman, Leon D. Lasser, Detroit Osteopathic Hospital, 12523 Third Ave., Detroit 3. Secretary, Crawford M. Esterline, Box 155, Kirksville, Mo.

American Osteopathic College of Radiology, annual meeting, Sheraton-Cadillac Hotel, Detroit, October 28-November 1. Program Chairman, George B. Hylander, West Side Osteopathic Hospital, 1253 West Market St., York, Pa. Secretary, F. A. Turfler, Jr., South Bend Osteopathic Hospital, 118 S. William St., South Bend 1, Ind.

American Osteopathic Hospital Association, annual meeting, Sheraton-Cadillac Hotel, Detroit, October 27-31. Program Chairman, Mr. Philip Rosenthal, Metropolitan Hospital, Philadelphia. Executive Secretary, Mr. R. P. Chapman, 604 Kahl Bldg., 326 W. Third St., Davenport, Iowa.

American Osteopathic Society of Proctology, annual meeting, Hotel Statler, Detroit, April 3-5. Program Chairman, John A. Brandon, 1814 Oberlin Ave., Lorain, Ohio. Secretary, Carl S. Stillman, Jr., 3523 Fifth Ave., San Diego 3, Calif.

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High concentration topical salicylate-menthol therapy (BAUME BENGUÉ) offers safe, penetrating relief of painful joints and muscles caused by overexertion.

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Increased percutaneous absorption of salicylate, with enhanced blood flow through the affected tissue is provided by BAUME BENGUÉ, offering up to 2.5 times more methyl salicylate (19.7%) and menthol (14.4%) than other topical salicylate preparations. In arthritis, myositis, bursitis and arthralgia, BAUME BENGUÉ induces deep, active hyperemia and local analgesia.

Lange and Weiner suggest the term "hyperkinemics" to describe preparations such as BAUME BENGUÉ which produce blood flow *through a tissue area.* They point out that hyperkinemic effect, as measured by thermoneedles, may extend to a depth of 2.5 cm. below the surface of the skin. (J. Invest. Dermat. *12*:263, May, 1949.)

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Menthol-induced hyperemia plus high local concentration of salicylate has been rediscovered as one of the most promptly effective remedies for rheumatoid discomfort due to exposure.

British Osteopathic Association, annual meeting, Andrew Still House, London, October 12-13. Program Chairman, M. R. Laing, 5, Eaton House, 39-40, Upper Grosvenor St., London W. 1. Secretary, Thurston True, Andrew Still House, 24-25 Dorset Sq., London N.W. 1.

California, annual meeting, Hotel del Coronado, Coronado, May 15-19. Executive Secretary, Mr. Thomas C. Schumacher, 1298 Wilshire Blvd., Los Angeles 17.

Canadian Osteopathic Association, annual meeting, Sheraton-General Brock Hotel, Niagara Falls, Ontario, October 18-20. Program Chairman, R. A. Linnen, 115 Metcalfe St., Ottawa, Ont. Secretary, Miss Joyce S. Currie, 609 Medical Arts Bldg., Montreal 25, Que.

Central States Osteopathic Society of Proctology: See Kentucky.

Colorado, Rocky Mountain Conference, Broadmoor Hotel, Colorado Springs, November 16-18. Program Chairman, A. E. Nichols, 1001 Joliet St., Aurora 8. Secretary, C. Robert Starks, 1459 Ogden St., Denver 18.

Georgia, midyear meeting, Atlanta Athletic Club, Atlanta, October 14. Program Chairman, F. R. Lovell, 806 Mortgage Guarantee Bldg., Atlanta 3. Annual meeting, King and Prince Hotel, St. Simons, May 9-11. Program Chairman, Walter B. Elliott, Jr., 702 Mortgage Guarantee Bldg., Atlanta 3. Secretary, Ruth McNeff Glass, 1432 Donnelly Ave., S.W., Atlanta 10.

Indiana, annual meeting, Marott Hotel, Indianapolis, May 19-21. Program

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Cochairmen, Paul van B. Allen, 1500 N. Delaware St., Indianapolis 2, and H. E. Rinne, 519-20 Merchants Bank Bldg., Indianapolis 4. Secretary, Arabelle B. Wolf, 4840 N. Michigan Rd., Indianapolis 8.

Kentucky, with Central States Osteopathic Society of Proctology, annual meeting, Brown Hotel, Louisville, November 12-14. Program Chairman, Charles R. Conley, 300 Main St., Greenup. Secretary, Kentucky Osteopathic Medical Association, Martha Garnett, 2829 Brownsboro Road, Louisville 6. Secretary, Central States Osteopathic Society of Proctology, L. L. Taylor, 115 N. Taylor St., South Bend 3, Ind.

Louisiana, annual meeting, Heidelberg Hotel, Baton Rouge, October 25-27. Program Chairman and Secretary, V. L. Wharton, 406-07 Weber Bldg., Lake Charles.

Maine, midyear meeting, Elmwood Hotel, Waterville, December 7-8. Annual meeting, Samoset Hotel, Rockland, June 27-29. Professional Education Chairman, Donald P. Miller, Main St., Norridgewock. Secretary, Roswell P. Bates, 72 Main St., Orono.

Michigan, annual meeting, Grand Rapids, September 30-October 2. Program Chairman, Harold W. Laidlaw, McCoy-Laidlaw Clinic, Bad Axe. Secretary, P. Ralph Morehouse, 214 S. Superior St., Albion.

Missouri, annual meeting, Sheraton-Jefferson Hotel, St. Louis, October 10-12. Program Chairman, R. A. Michael, 209 Monroe St., Jefferson City. Executive Secretary, Mr. Paul D. Adams, 325 E. McCarty St., Jefferson City.

New York, annual meeting, Hotel Utica, Utica, October 12-13. Program Chairman, Allen S. Prescott, 800 Keith Bldg., Syracuse 2. Secretary, C. Fred Peckham, 27 W. Bridge St., Oswego.

North Carolina, annual meeting, Battery Park Hotel, Asheville, October 25-27. Program Chairman and Secretary, S. Dales Foster, 710 Public Service Bldg., Asheville.

Northwest Osteopathic Convention, Multnomah Hotel, Portland, Oregon, June 17-20. Program Chairman, Russell F. Kenaga, 2265 W. Burnside St., Portland 5, Ore.

Oklahoma, annual meeting, Biltmore Hotel, Oklahoma City, November 7-9. Program Chairman, Melvin A. Kiesel, Hinton Community Hospital, Hinton. Executive Secretary, Mr. Walter L. Gray, 210-212 Braniff Bldg., Oklahoma City.

Ontario, annual meeting, Orillia, May 2-4. Program Chairman, C. V. Hinsperger, 806 Canada Bldg., Windsor. Secretary, A. V. DeJardine, 205 Yonge St., Toronto 1.

Oregon: See Northwest Osteopathic Convention.

Rocky Mountain Conference: See Colorado.

South Dakota, annual meeting, Huron, June 2-3. Program Chairman, F. A. Nutter, Jr., Box 368, Beresford. Secretary, Earl W. Hewlett, 417 W. 27th St., Sioux Falls.

Virginia, midyear meeting, Chamberlin Hotel, Old Point Comfort, October 13-14. Program Chairman, Felix D. Swope, 126 N. Columbus St., Alexandria. Secretary, John A. Cifala, 2778 N. Washington Blvd., Arlington.

Washington: See Northwest Osteopathic Convention.

West Virginia, midyear meeting, Greenbrier Hotel, White Sulphur Springs, October 21-23. Annual meeting, Daniel Boone Hotel, Charleston, June 2-4. Program Chairman for both meetings, Frank E. Pick, 4410 McCorkle Ave., S.W., South Charleston 3. Secretary, Guy E. Morris, 542 Empire Bank Bldg., Clarksburg.

State and national boards

ARIZONA

Those interested in professional examinations should contact Russell Peterson, D.O., secretary, Osteopathic Board of Registration and Examination in Medicine and Surgery, 2747 East McDowell Road, Phoenix.

Basic science examinations December 18 at the University of Arizona, Tucson. Applications must be filed 2 weeks prior to examination. Address H. D. Rhodes,

Ph.D., secretary, Basic Science Board, University of Arizona, Tucson.

ARKANSAS

Paul W. Lecky, El Dorado, and H. V. Glenn, Stuttgart, have been reappointed to the Board of Osteopathic Examiners for terms expiring in 1960.

COLORADO

Professional examinations December 4-5 at Denver. Applications must be filed by November 2. Address Mrs. Beulah H. Hudgens, executive secretary, Board of Medical Examiners, 831 Republic Bldg., Denver 2.

Basic science examinations December 5-6. Applications must be filed by November 21. Address Esther B. Starks, D.O., secretary, Basic Science Board, 1459 Ogden St., Denver 18.

CONNECTICUT

Professional examinations November 13-14. Applications must be filed by October 30. Address Frank Poglitsch, D.O., secretary, Osteopathic Examining Board, 300 Main St., New Britain.

DELAWARE

Examinations January 8-10. Address Joseph S. McDaniel, M.D., secretary, Board of Medical Examiners, 229 S. State St., Dover.

DISTRICT OF COLUMBIA

Professional examinations November 12-13. Address Mr. Paul Foley, Deputy Director, Department of Occupations and Professions, 1740 Massachusetts Ave., N.W., Washington 6.

FLORIDA

Professional examinations December 1-2 at the Hotel Seminole, Jacksonville. Applications must be filed by November 1. Address W. S. Horn, D.O., secretary, Board of Osteopathic Medical Examiners, P.O. Box 85, Palmetto.

Officers of the Board are: Louis J. Larmoyeux, Jacksonville, chairman; C. Markel Becker, Winter Haven, vice chairman; and Dr. Horn, secretary-treasurer. Edmund T. Flynn, Tallahassee, has been reappointed to the Board for a term expiring in 1959.

Basic science examinations November 5 at Gainesville. Applications must be filed by October 17. Address M. W. Emmel, D.V.M., secretary, Board of Examiners in the Basic Sciences, P.O. Box 340, Gainesville.

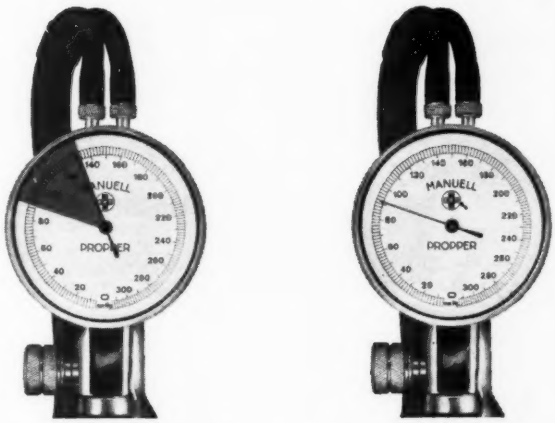
HAWAII

Examination dates by Territorial Law are usually the first Wednesday, Thursday, and Friday of January, April, July, and October. One of these dates is set for examination after approval of the candidate's application by the Board. Address Frank O. Gladding, D.O., secretary, Board of Osteopathic Examiners, 504 Kauikeolani Bldg., Honolulu 13.

IDAHO

Examinations November 8 at Boise. Address Miss Margaret Gilbert, Director, Occupational License Bureau, Department of Law Enforcement, State House, Boise.

when Rauwolfia alone is not enough . . .



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ILLINOIS

Examinations in January in Chicago. Address Mr. Frederic B. Selcke, Superintendent of Registration, Department of Registration and Education, State House, Springfield.

IOWA

Basic science examinations January 8 at the Capitol Bldg., Des Moines. Address Ben H. Peterson, Ph.D., secretary, Board of Basic Science Examiners, Coe College, Cedar Rapids.

KANSAS

Examinations February 14-15 at the Jayhawk Hotel, Topeka. Address C. A. Welker, D.O., secretary, Board of Osteopathic Examination and Registration, J. C. Penney Bldg., Concordia.

MAINE

Examinations November 13-14 at Augusta. Address George Frederick Noel, D.O., secretary, Board of Osteopathic Examination and Registration, Monument Square, Dover-Foxcroft.

MARYLAND

Examinations in October. Address Christopher L. Ginn, D.O., secretary, Board of Osteopathic Examiners, 419 No. Charles St., Baltimore 1.

MASSACHUSETTS

Examinations January 8. Address Rob-

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ert C. Cochrane, M.D., secretary, Board of Registration in Medicine, Room 37, State House, Boston 33.

MINNESOTA

Basic science examinations in January Applications must be filed by December 10. Address Raymond N. Bieter, M.D., secretary, Board of Examiners in the Basic Sciences, 105 Millard Hall, University of Minnesota, Minneapolis 14.

NEBRASKA

Basic science examinations January 8-9. Address Mr. Husted K. Watson, Director, Bureau of Examining Boards, Department of Health, State Capitol Bldg., Lincoln 9.

NEVADA

Professional examinations in January. Address Walter J. Walker, D.O., secretary, Board of Osteopathic Examiners, 210 W. Second St., Reno.

Basic science examinations January 8. Address Donald G. Cooney, Ph.D., secretary, Board of Examiners in the Basic Sciences, Box 9005, University Station, Reno.

NEW JERSEY

Examinations October 16. Address Patrick H. Corrigan, M.D., acting secretary, Board of Medical Examiners, 28 W. State St., Trenton 8.

NEW MEXICO

Basic science examinations October 21. Address Mrs. Marguerite Cantrell, secretary, Board of Examiners in the Basic Sciences, P.O. Box 1522, Santa Fe.

NORTH DAKOTA

Examinations in January. Address G. L. Hamilton, D.O., secretary, Board of Osteopathic Examiners, Ringo Bldg., 119 S. Main St., Minot.

OHIO

Examinations December 18-20 at Columbus. Applications must be filed by December 4. Address H. M. Platter, M.D., secretary, Medical Board, 21 W. Broad St., Columbus 15.

RHODE ISLAND

Professional examinations January 3-4. Address Mr. Thomas B. Casey, Administrator of Professional Regulation, 366 State Office Bldg., Providence.

Jeremiah F. Crowley, Pawtucket, has been elected secretary of the Board of Examiners in Osteopathy. Frederick S. Lenz, Cranston, has been appointed to the Board for a term of 3 years.

Basic science examinations November 14 in Room 366, State Office Bldg., Providence. Address Mr. Casey.

SOUTH CAROLINA

Examinations November 20 at Columbia. Address Ernest A. Johnson, D.O., secretary, Board of Osteopathic Examiners, Box 525, Summerville.

SOUTH DAKOTA

Professional examinations January 15-16 at Sioux Falls. Address Mr. John C. Foster, executive secretary, Board of Medical and Osteopathic Examiners, Room 300, First National Bank Bldg., Sioux Falls.

Basic science examinations December 7-8 at the Medicine and Science Building, University of South Dakota, Vermillion. Applications must be filed by November 23. Address Gregg M. Evans, Ph.D., secretary, Basic Science Board, 310 E. 15th St., Yankton.

TENNESSEE

Examinations in February and July at Nashville. Applications must be filed 15 days prior to examination. Address M. E. McCoy, D.O., secretary, Board of Examination and Registration for Osteopathic Physicians, 1226 Highland, Jackson.

TEXAS

Examinations December 6-8 at the Hilton Hotel, Fort Worth. Applications for license by reciprocity must be filed at least 30 days prior to the meeting, and applications for examination must be on file 10 days prior to the meeting. Address M. H. Crabb, M.D., secretary, Board of Medical Examiners, 1714 Medical Arts Bldg., Fort Worth 2.

VERMONT

Examinations in January. Address Charles D. Beale, D.O., secretary, Board of Osteopathic Examination and Registration, Mead Bldg., Rutland.

WASHINGTON

Professional examinations in January. Address Mr. Edward C. Dohm, secretary, Professional Division, Department of Licenses, Olympia.

Basic science examinations in January. Applications must be filed 30 days prior to examination. Address Mr. Dohm.

WISCONSIN

Examinations January 8 at Madison. Address Thomas W. Tormey, Jr., M.D., secretary, Board of Medical Examiners, State Office Bldg., 1 West Wilson St., Madison.

Basic science examinations December 1 at the Hotel Schroeder, Milwaukee. Applications must be filed by November 23. Address Mr. W. H. Barber, secretary, Board of Examiners in the Basic Sciences, Ripon College, Ripon.

Reregistration of osteopathic licenses

October 31—Pennsylvania, $5.00. Address Mrs. Katherine M. Wollet, acting secretary, Bureau of Professional Licensing, Harrisburg.

On or before November 1—Missouri, $2.00. Address F. C. Hopkins, D.O., secretary, Board of Osteopathic Registration and Examination, 205 N. Fourth st., Hannibal.

By November 1—Rhode Island, $1.00. Address Mr. Thomas B. Casey, Administrator of Professional Regulation, 366 State Office Bldg., Providence.

December 1 — District of Columbia, $2.00. Address Mr. Paul Foley, Deputy Director, Department of Occupations and Professions, 1740 Massachusetts Ave., N.W., Washington 6.

December 1 — Georgia, $3.00. If renewed after December 31, the fee is $10.00. For information address Harry E. Huff, D.O., acting secretary, Board of Osteopathic Examiners, Tifton.

December 1—Oregon, resident, $15,00; nonresident inactive, $5.00. Address Mr. Howard I. Bobbitt, executive secretary, Board of Medical Examiners, 609 Failing Bldg., Portland 4.

December 31—Tennessee, $5.00. Address M. E. Coy, D.O., secretary, Board of Examination and Registration for Osteopathic Physicians, 1226 Highland, Jackson.

Prior to January 1—Arizona, not more than $10.00. Address Russell Peterson, D.O., secretary, Osteopathic Board of Registration and Examination in Medicine and Surgery, 2747 E. McDowell Rd., Phoenix 22.

January 1—California, $20.00 for residents and nonresidents. Address Glen D. Cayler, D.O., secretary, Board of Osteopathic Examiners, 1013 Forum Bldg., Sacramento 14.

January 1—Florida, $5.00. Address W. S. Horn, D.O., secretary, Board of Osteopathic Medical Examiners, 1500 Eighth Ave., Palmetto.

January 1—Maine, $4.00. Address George F. Noel, D.O., secretary, Board of Osteopathic Examination and Registration, Monument Square, Dover-Foxcroft.

January 1—Manitoba, $5.00. Address W. Kurth, D.O., secretary, Board of Osteopathic Physicians, 248 Moorgate Blvd., Deer Lodge, Winnipeg.

January 1—New York, $5.00, biennially. A physician receiving a license the second year of any biennial registration period pays a fee of $2.50 for a certificate expiring December 31 of such second year. Address Stiles D. Ezell, M.D., secretary, Bureau of Professional Examinations and Registrations, 23 S. Pearl St., Albany 7.

January 1—Ontario, $35.00. Address D. Gordon Campbell, D.O., secretary, Board of Directors of Osteopathy, 2 Bloor St., E., Toronto 5.

January 1—Pennsylvania, Surgeons Examining Board, $10.00. Address Mrs. Katherine M. Wollet, acting secretary, Board of Osteopathic Examiners, Bureau of Professional Licensing, Harrisburg.

January 1—Texas, $5.00. Address M. H. Crabb, M.D., secretary, Board of Medical Examiners, 1714 Medical Arts Bldg., Fort Worth 2.

January 1—Utah, $3.00. Address Alice E. Houghton, D.O., secretary, Osteopathic Examining Board, 600 Zion's Sav-

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omy, including histology and embryology; physiology; physiological chemistry; general pathology; and bacteriology, including parasitology and immunology.

Part II consists of examinations in surgery, including applied anatomy, surgical pathology, and surgical specialties; obstetrics and gynecology; pediatrics, neurology and psychiatry; public health, including hygiene, medical jurisprudence; osteopathic principles, therapeutics, including pharmacology and materia medica.

Part III is an oral and practical examination given under the supervision of a chief examiner who is a member of the Board and by a panel of associate examiners. Subjects covered in Part III are anatomy; physiology; pathology; osteopathic principles; therapeutics, and pharmacology; surgery; ophthalmology and otorhinolaryngology; obstetrics and gynecology; physical and clinical diagnosis; public health and communicable diseases.

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Applications must be filed with the secretary of the Board not less than 30 days prior to the examination dates. Address Paul van B. Allen, D.O., secretary, 1512 N. Delaware Street, Indianapolis 2, Indiana.

Examination by National Board

The National Board of Examiners for Osteopathic Physicians and Surgeons conducts Parts I and II of its examination on the first Thursday and Friday of each May and December at the six approved colleges. Application blanks may be obtained from the secretary or the dean of the college, and the completed application blank, together with a passport photograph and check for the parts to be taken, must be in the secretary's office by the November 1 or April 1 preceding the examination.

Examinations in Part 1 consist of anat-

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January—Alberta. No reregistration. Pay $10.00 a year membership in the College of Physicians and Surgeons, Alberta, in January.

During January—Connecticut, $2.00. Address Frank Poglitsch, D.O., secretary, Osteopathic Examining Board, 300 Main St., New Britain.

During January—Minnesota, $2.00. Address Wallace F. Kreighbaum, D.O., secretary, Board of Osteopathic Examiners, 2748 Hennepin Ave., Minneapolis 8.

During January—Wisconsin, $3.00. Address Thomas W. Tormey, Jr., M.D., secretary, Board of Medical Examiners, State Office Bldg., 1 W. Wilson St., Madison.

Muscular dystrophy*

Jonathan Cohen, M.D.
Robert Schwartz, M.D.
Charles A. Janeway, M.D.

Among the chronic diseases which have attracted attention in the field of public health, muscular dystrophy has many interesting features. The widespread publicity given this disease has emphasized and distorted many of the problems it

*From the Department of Orthopedic Surgery and Medicine, Children's Medical Center, Boston, Massachusetts. Reprinted from *Health News* (May, 1956), published monthly by the New York State Department of Health, Albany, New York.

presents to the community. In this article we will try to portray these problems and some of the more recent efforts to solve them.

The first difficulty is that of defining the disease. The term *muscular dystrophy* applies in general to a condition of muscular weakness without neurological disease, of disseminated or generalized distribution, and attributable to degenerative changes localized in the muscle fibers. The etiology of the disease is unknown, and diagnosis rests almost entirely on clinical characteristics. These characteristics differ so widely from case to case that a classification of the main groups is imperative; yet no group of criteria has been acceptable to all concerned. Broadly speaking, there is general agreement on two groups of patients: the Duchenne type and the facioscapulohumeral type. No single criterion, however, is present in all cases included by each author under the two designations.

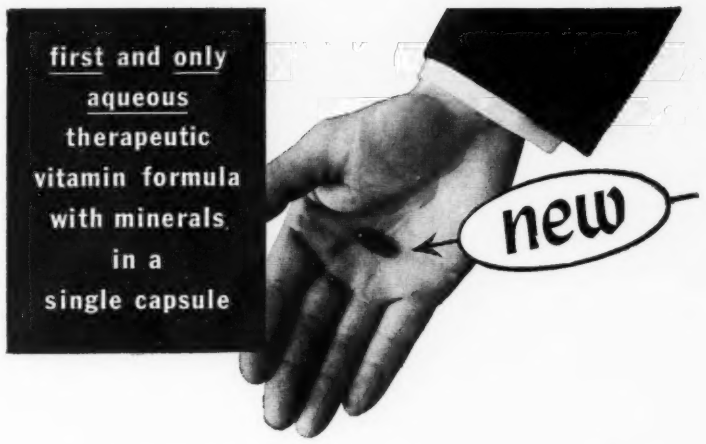
The Duchenne type occurs usually in boys, in the first four to six years of life, is accompanied by pseudohypertrophic changes in the muscles, and is slowly progressive so that the patients rarely survive beyond the age of 18. Since about half of these patients present histories of familial incidence of the disease, with genetic analysis strongly in favor of sex-linked recessive inheritance, as in hemophilia, the occurrence of this type of disease in girls, though rare, demands explanation. It seems clear that the cases in girls and probably some of those in boys are due to an autosomal rather than to a sex-linked gene. This has led some authors to place the cases of autosomal origin in a third group, generally called the limb-girdle type. Others, in accepting such cases as the Duchenne type, resort to intricate and improbable genetic mechanisms to explain these exceptions. Similar difficulties in classification arise with respect to three other main characteristics of the Duchenne type of muscular dystrophy—its onset in early childhood, its progressive course, and its characteristic pseudohypertrophy. Since this form of muscular dystrophy is not the only one which occurs in childhood, one is not justified in calling this the childhood type of dystrophy. Similarly, although these cases rarely are nonprogressive, other forms of dystrophy include a few cases which are just as progressive in their course. The term progressive, therefore, cannot be restricted to this type. Pseudohypertrophy, the gross enlargement of muscle bellies without increase in muscle strength, occurs in most cases, but may occur also in the other types, though rarely. Thus, one cannot name any single clinical characteristic which of itself characterizes all cases and no others.

However, once the exceptional cases are excluded, the clinical similarity of the Duchenne group is striking. The delayed motor development noted in infancy, the inability of these boys to keep up with their fellows in running, the progressive difficulty in climbing stairs in the early school years, and the defective posture and gait are too well known for detailed description here. However, the absence of mild or abortive cases should be underscored. Where familial incidence is definite, symptoms and signs in siblings are either sufficient for presumptive diagnosis or are absent. That is, no instances of *formes frustes* or of incomplete penetrance are known.

The progression of the disease, though unremitting, in some cases does not pass beyond the stage of difficulty in walking. Most patients, however, deteriorate to a wheel chair existence, and many progress to immobility in bed and ultimate death through respiratory failure.

We have described the Duchenne type of muscular dystrophy in detail for several reasons. The medical difficulties in classification, in genetic analysis, and in prognosis are reflected in confusion surrounding the practical problems of patient care, family counseling, and schooling, to name but a few.

We shall return to these problems later, but must consider briefly the other forms of dystrophy since, in the general usage of the term, all groups are included. Facioscapulohumeral dystrophy is a well-defined type. Nearly all of these patients present definite familial incidence, which, when analyzed genetically, strongly supports a mechanism of autosomal dominant inheritance. The unusually high regional incidence of this type of muscular dystrophy in the State of Utah can be explained genetically. In most other areas, these cases are fewer in number than those of the Duchenne type. Onset



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occurs before the age of 30, usually in the second decade, and progression is very slow so that the patients are seldom totally incapacitated and may survive to old age. Abortive cases are frequent, and often in such cases the face is minimally involved. This characteristic, where familial incidence is low, is of value in differentiating facioscapulohumeral dystrophy from the other types of the disease. Many of these cases show slow progression of involvement from the muscles of the pectoral girdle to those of the pelvic girdle and back but rarely become completely nonambulatory.

The third form of muscular dystrophy, termed by Walton and Nattrass the limb-girdle type, includes cases in which either pelvic or pectoral girdles show the initial involvement, in which progression always occurs, but at a variable rate and to a variable degree, and in which familial incidence is uncommon. Some of these cases begin in late childhood, others in early adult life, while a few appear during middle age. Ultimately, half of this group progress to total incapacity but only after many years. This type of dystrophy occurs about as commonly as the facioscapulohumeral group and may, according to other classifications, include separate distinct subtypes whose definition would not be appropriate in this paper.

When muscular dystrophy is considered from the public health point of view, our main concern is with patients of the Duchenne group since they are the most numerous and present the most varied problems. How numerous they are in the United States is difficult to estimate since thorough population studies are not available. In England and North Ireland, however, two studies of populations numbering 2,000,000 and 1,400,000 yielded an incidence of 46 and 35 cases respectively. Judging by recent reports, the number of cases seems to be increasing compared with the number one or more generations ago. If this suggested increase is a true phenomenon and not due to better reporting of cases, it cannot be attributed to increased survival or to more efficient diagnosis since neither of these factors has been dramatically affected by recent medical advances. If it is genetic in origin, however, we must explain it on the basis of a high and perhaps increasing mutation rate although this possibility is remote indeed. Since the etiology is unknown, other unknown reasons for the increase in incidence may also be operative.

One factor which tends to reduce the incidence of the disease is the reduction in the size of a family as a direct consequence of the appearance of a case. However, since the disease is usually not diagnosed in the first few years of life, it is possible for the mother to pass the genetic trait to several children, especially to her daughters, before an adequate appraisal of the genetic problem can be made. It is easy to imagine the predicament of the physician, faced with the uncertain knowledge of the genetics of this problem, when parents need practical answers to questions concerning the possible outcome of future pregnancies.

When a patient's ability to carry on normal activities becomes seriously impaired, the problem of the family becomes very difficult to meet. During the period when the child can still attend school the difficulties are relatively minor—he cannot attend a school where much stair climbing is necessary, or he requires special attention both in school and at home. When the child can no longer walk, however, his problems become unique when compared with those of most other handicapped children. The physical effort of handling such a child, often markedly obese from inactivity, of transferring him from wheel chair to bed and back, of bathing and attending to his toilet needs, often take up much of his mother's time. Help from community agencies in the form of visiting nurses, physiotherapists and other types of assistance is seldom significant in the face of a situation which is so chronic and progressive. When one interviews groups of parents who have children with muscular dystrophy, one is struck by the inadequacy of community facilities to aid these families. The hopelessness of the situation makes it difficult for medical practitioners to fulfill well their supportive role when illness in these patients demands attention. The services of home school teachers, visiting nurses, and physiotherapists are often sought eagerly and used for a time to provide

personal contacts outside the family circle to the affected children. After a while these aids are gradually dropped. Most patients who are totally incapacitated eventually become shut-ins who may be taken out of the house once or twice a year and who do little else but watch television.

There has been no great pressure for facilities for hospitalization or custodial care of these patients since their disabilities develop so gradually and since the family group as a rule can accommodate itself to them. A few patients find their way into institutions for the schooling and care of handicapped children. Generally speaking, however, officials of such institutions, with their facilities in great demand, prefer not to accept muscular dystrophy patients because of the special problems which their progressive weakness imposes on the staff.

What is being done and can be done to remedy the situation? The first emphasis is on medical research. Those organizations interested in muscular dystrophy have encouraged investigators to tackle different phases of the fundamental problems of the anatomy, physiology, biochemistry, and pathology of muscles, and have aided materially in the support of these investigations. The variety of approaches which are being made to the study of the disease is a reflection of our ignorance of its causes and, indeed, of the precise localization of the pathological process. With the wide field of research needed, intensive studies in all of the directions which suggest themselves are obviously impossible. The choice of the leads which are most promising is very difficult, in contrast to research on such diseases as poliomyelitis where many of the characteristics of the etiological agent are known and studies can be planned with assurance of direct applicability of the knowledge obtained to prevention or amelioration of the disease process.

In this article it is impossible even to touch upon the multitudinous studies, recent and current, which relate to muscular dystrophy. Many organizations are providing financial support for these research projects. Through the intramural and extramural programs of the National Institute of Arthritis and Metabolic Disease and the National Institute of Neurological Diseases and Blindness (two of the National Institutes of Health) work in this field has consistently been encouraged. Some states have also lent their support either directly or through state medical schools; many charitable foundations and private educational institutions have helped through the medical schools and hospitals connected with them. Three different volunteer organizations — the Muscular Dystrophy Associations of America, The National Foundation for Muscular Dystrophy, and the National Foundation for Muscular Dystrophy Research—are dedicated to finding the cause and thus the means of preventing or curing muscular dystrophy. They were formed by parents of affected children, by sufferers from the disease, or by friends of its victims, and are raising funds through public campaigns in order to provide money for research.

Although research is extending our understanding of muscle function and structure, we are still ignorant of the nature and cause of the dystrophic process. As in other fields many of the studies, which later may prove of utmost importance, at present may seem related only to basic physiological processes whose applicability to muscular dystrophy is far fetched indeed. Research directly relating to the disease process has been disappointing in the results achieved. For example, it is very desirable to have laboratory tests, preferably of quantitative type, to assist in the diagnosis of very early cases or in the recognition of slight changes in the course of the disease. Laboratory procedures have been of little help with the possible exceptions of the histological diagnosis of biopsy material and the measurement of creatine metabolism. Neither of these procedures has contributed a great deal more to the understanding of individual cases than can be obtained by clinical appraisal of the patients in the time-honored manner.

Approaches to therapy have also proved difficult. The mainstay of medical treatment has been the art of physiotherapy which tries to prevent loss of function by promoting proper muscle activity and the prevention of deformity. To learn how effective these measures really are for these patients is the goal of an intensive

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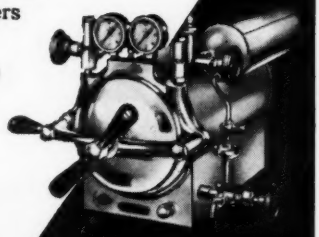

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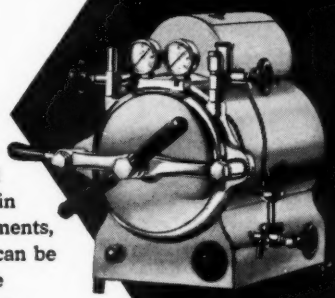

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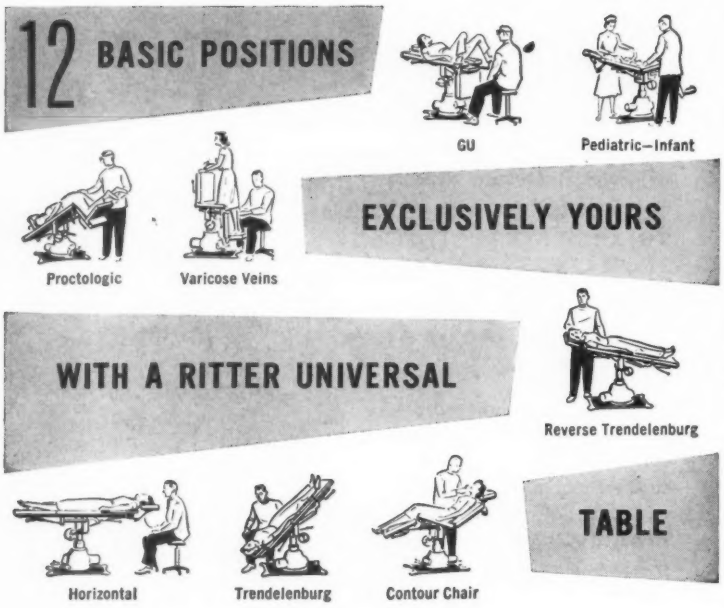

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study at the New York State Rehabilitation Center at West Haverstraw. In this hospital a group of workers has tried to determine which rehabilitation measures will prove most effective for these patients. Coordinately, drug-testing programs have been devised to evaluate the possible effects of different preparations on the course of the disease. Similar drug testing programs have been started at other centers. The planning of these programs is made particularly difficult by the unique specificity of the disease for human subjects, by the lack of any similar condition in animals which might provide a basis for preliminary screening of drugs, and by the lack of any rational basis for the selection of potential therapeutic agents.

Some of the specific medical problems of these patients will undoubtedly be answered as research continues but thus far research has had but little impact on the practical aspects of handling these patients and their families. In the absence of any specific medical treatment, emphasis must be placed on minimizing physical disability by judicious physiotherapy but, above all, on doing everything possible to give the patient and his family an opportunity for as full a life as possible. Thus the treatment of the patient with this disease, as in the other chronic, incurable disorders, must be primarily social rather than medical. A great need exists for integrated and varied community services providing a broad program of care for this type of patient. Only under unusual circumstances are families able to provide such a program through their own resources and, generally speaking, they must call upon the community for help. As we have indicated, the help available is usually inadequate.

Although the number of cases of muscular dystrophy in any large community is sufficient to justify some provision for these patients, it is certainly insufficient to warrant a program for them (even if it were desirable) entirely separate from those for children with other severe handicaps. We believe the soundest community approach to this problem is through coordination of services to many types of handicapped children, with sufficient elasticity in these services to meet the special needs of each group. The coordination of physiotherapy, occupational therapy, special educational opportunities, recreational activities, and group psychotherapy for parents such as that provided in the better rehabilitation centers, is needed on a home care basis for many of these children. Moreover, since the burden of care tends to fall heavily on the parents, particularly the mothers of these home-bound children, means must be found not only to get the child out of his home on occasion but also to give his mother a much needed respite from the constant physical and emotional strain to which she is inevitably subjected. The same general services and facilities are needed for patients with cerebral palsy, paralytic poliomyelitis, certain congenital anomalies and other crippling diseases of childhood. They could easily be extended to include patients with muscular dystrophy.

Each community presents unique problems as to the means to be adopted in coordinating the activities and resources of tax-supported agencies and privately financed charitable organizations in order best to achieve the basic objective of providing for each child the maximum opportunity for self-development within the limits imposed by his handicap. The private physician, who often acts as family counselor, is usually acquainted with some of the facilities available to his patients but, as often as not, is not in a position to coordinate the type of total home care which is necessary in so many cases. In one area, the need may best be met by designating a regional center for assessing the needs of such patients and directing them to the proper service facilities; in another, the provision of a number of medical social workers may be a more effective means of mobilizing the total resources of the community for the benefit of handicapped children. In any case, until the happy day when medical science is able to provide the means of preventing or curing muscular dystrophy, it is an obligation of every community to provide the social mechanisms for giving the victims of this disease the opportunity for as full a life as possible in common with all other children with severely handicapping diseases.

Cancer in midlife*

Cancer (malignant neoplasms) ranks second only to heart disease as a cause of death in middle life, that is, in the age range 45-64 years. In 1955 there were more than 90,000 cancer deaths at these ages in the United States; they accounted for about one fourth of the total mortality in this age group and for nearly two fifths of the deaths from cancer at all ages combined. It is estimated that one out of every eight persons reaching age 45 will develop cancer by age 65.

Currently, about 230,000 new cases of cancer occur in our country each year among persons in the age range 45-64; 125,000, or little more than half, are among women. These estimates are based upon the findings in the cancer morbidity survey made in 10 major cities in 1947-48.† At the time of that study, there was about one case of cancer in every 200 white women at ages 45-49, the proportion increasing to one in every 90 at ages 60-64. Among white men the corresponding rise in prevalance of the disease with advance in age was much more rapid—from one case in every 350 to one in every 80. This morbidity study indicated that in middle life the most common sites of cancer among white women were the breast and uterus, and among white men the skin and lung.

The mortality from cancer in recent years has shown divergent trends for the two sexes. Among white women insured under Industrial policies in the Metropolitan Life Insurance Company, the cancer death rate in middle life fell 13 percent between 1944-45 and 1954-55. At ages 45-54 the rate decreased from 196.6 to 171.3 per 100,000, and at ages 55-64 from 391.2 to 340.1. Among white men the death rate from the cause rose about as rapidly as it fell among women. As a consequence of these divergent trends, the cancer death rate among men is now 13 percent higher than that for women at ages 45-54, whereas a decade earlier it was 11 percent below the rate for women. At ages 55-64, the excess male mortality from cancer increased from 16 percent to more than 50 percent.

The upward trend in cancer mortality among middle-aged men has been due largely to the marked rise in the recorded death rate from lung cancer. In the decade between 1944-45 and 1954-55 lung cancer at ages 45-54 increased from 34.3 to 59.2 per 100,000, or by three fourths, and at ages 55-64 from 75.3 to 143.6, or nearly double. The factors which may be involved in this rise are under intensive investigation. Much of it is believed to reflect more frequent detection of such cancers and the more common tendency to designate the lung as the primary site, but part of the rise is believed to be real. At present, lung cancer in this insurance experience accounts for nearly 30 percent of the total cancer mortality among men in the age range 45-64. The rate is at least three times the comparable death rate from cancer of the stomach, the next leading site.

In both sexes there has been a sizable reduction in the mortality from cancer of the digestive tract, especially of the stomach. The reasons for this favorable trend are obscure. While some progress has been made in the surgical treatment of stomach cancer, this is probably not a major factor, because only a relatively small proportion of the cases are caught early enough for treatment to be successful. It appears more likely that the recorded decline in mortality represents, in part, the generally increased accuracy in diagnosis and reporting, with fewer deaths being attributed to cancer of the stomach; in part, the decline may reflect a real decrease in the frequency of stomach cancer.

Middle-aged women experienced a reduction of about a third in the mortality from uterine cancer. This is one of the brightest features of the cancer picture because it reflects the results of preventive measures, and of early diagnosis and therapy. More specifically, the progress made in this area of cancer control is a consequence of the prevention or correction of injuries sustained during

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Company, June, 1956.

†Dorn, Harold F., and Cutler, Sidney J., *Morbidity From Cancer in the United States, Part 1.* Public Health Monograph No. 29, Public Health Service, 1955.

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childbirth, the intensified search for cases in their early stages—aided in recent years by the use of the Papanicolaou technique—and prompt treatment by surgery and radiation. A puzzling phenomenon, however, is the relative stability of the mortality from breast cancer among women, despite a widespread campaign for early detection of cancer in this accessible site. The fact that breast cancer often spreads before the woman is aware of the disease is probably a partial explanation. It may be that the trend is more favorable than appears from the figures because there has been an increasing tendency for the breast to be designated as the primary site when it is reported in association with cancer of other sites. Death rates as well as incidence rates are higher for cancers of the breast and uterus than for any other sites among middle-aged women. Together, these two sites account for more than two fifths of all cancer deaths among women at ages 45-54 and for about one third at ages 55-64.

Fatal cancers in middle life are considerably more frequent among men than among women for practically all sites, except the breast and genital organs. The difference is especially large for cancer of the lung, the death rate for males being more than 10 times that for females. A large excess in cancer mortality among males is also recorded for the buccal cavity, stomach, and urinary organs. In general, the excess male mortality is relatively greater at ages 55-64 than at 45-54.

The cancer death toll in the United States could be reduced appreciably if men and women in middle life sought prompt medical attention for symptoms that might signify malignant growth. In the present state of knowledge, early detection and treatment are the major means of control. Hope for the ultimate solution of the cancer problem depends upon research into the causes of the disease.

Cardiovascular diseases and public health*

By John W. Ferree, M.D., M.P.H.†

ASSOCIATION-HEALTH DEPARTMENT RELATION

At about the same time the American Heart Association became a voluntary health agency, the National Heart Institute came into being as one of the National Institutes of Health. In 1950, lay and professional leaders of the two groups met together in Washington for the First National Conference on Cardiovascular Diseases "to determine what we know about cardiovascular disease and how we can apply this knowledge to prevent and cure it." What came out of the conference became the basis for much of the work that both groups have since done.

This past year, the National Heart Institute and the American Heart Association undertook an educational campaign against rheumatic fever, jointly preparing materials for distribution to health departments and heart associations. The basis of the campaign is a 4-page statement by the AHA Council on Rheumatic Fever and Congenital Heart Disease, entitled "Prevention of Rheumatic Fever and Bacterial Endocarditis Through Control of Streptococcal Infections." This was issued first in 1953 and revised in 1955. Other educational materials in the "Stop Rheumatic Fever" unit[1] include a black-and-white film, discussion guide, and leaflets.

The Manual on Administration and Organization for Affiliates of the American Heart Association clearly spells out the heart association-health department relationship:

"Official agencies are legally charged with the responsibility of protecting the public's health. Heart associations have

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†Dr. Ferree is director of community services and education, American Heart Association, New York, N. Y. He was formerly State health commissioner of Indiana.

voluntarily assumed a share in this responsibility and should work closely with official agencies toward their common goal.

"Any programs undertaken by a heart association should be brought to the attention of the health department. A number of health departments have developed extensive programs for the control of heart disease. Because these programs, like those of heart associations, are financed by public funds, both agencies are responsible for seeing that the funds are not wasted through overlapping or competitive programs.

"A practical arrangement is to have an officer or board member of the heart association on the health department's advisory committee and to have a member of the board or staff of the health department on the board of the heart association.

"This does not mean that every enterprise must be a joint one; each agency maintains its identity and individuality because each has something different to offer. The broad community representation in the heart association makes it possible for the association to furnish leadership, to act as a pioneer in program development, and to stimulate the official agency to make the best possible use of its resources of money and personnel. Very often the two agencies working together can accomplish more than they could achieve separately."

How does this statement work in practice?

In New York staff members of the statewide heart affiliate spend 2 or 3 days each year in meetings with representatives of the State health department, welfare department, and division of vocational rehabilitation. At these meetings, government and heart association personnel exchange ideas and information on rehabilitation, public health nursing and education, school health, chronic disease, and other areas of mutual concern.

Not only do the groups find they understand each other better, but often new programs develop as a result of these sessions. From the liaison in New York, the heart affiliate undertook a demonstration project in rehabilitation at the suggestion of the State health department. The health department will take over the project—paying the salary of a rehabilitation counselor on the health department team—at the end of the 3-year demonstration period.

Sometimes the financial responsibility for projects is reversed, as in the cardiac work classification unit of the Heart Association of Southeastern Pennsylvania. The Pennsylvania Department of Health finances the unit, which provides for service to individuals whose employment problems are caused by cardiovascular disease.

One of the reasons heart associations find it so important to work with their local health departments, medical societies, and other groups stems from the AHA policy of spending money not for individual care but for community programs in cooperation with others, for demonstration projects where needed facilities do not exist, or for salaries and equipment to supplement the services of some other agency.

Behind this policy is the belief that the association's purposes will not be best served by giving financial aid to individuals to cover the costs of medical or nursing care, hospital bills, or drugs. Tremendous sums, far greater than those available to the association, would be necessary to meet such requirements on a fair and comprehensive basis. Moreover, diverting the association's limited funds to comparatively few individual patients would undermine its ability to carry out the program it has evolved to benefit all heart patients and to reduce cardiovascular disease as a threat to the Nation's health.

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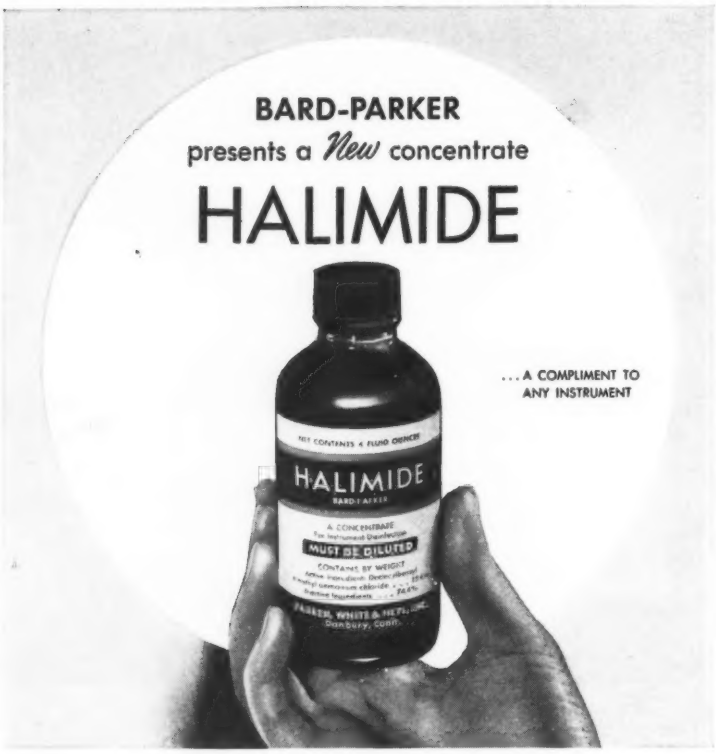
HEALTH DEPARTMENT PROBLEMS

The American Heart Association recognizes the difficulties faced by health departments in meeting the problems of cardiovascular diseases. Shortage of funds, insufficient personnel, hands full just keeping up the traditional health department functions—these are familiar conditions. Yet, as the communicable diseases fade as a major health problem and the chronic illnesses take their place, changes will be appropriate and possible.

A recent study made in Buffalo, N. Y., reveals that crowding, water supply, and



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sewage disposal have little bearing on four of the most frequent causes of death—heart disease, cancer, stroke, and diabetes.[2] Certainly this is not to say that health departments should lessen their vigilance on the old problems. They will still be with us. And, as the Buffalo study also shows, deaths from infective and parasitic diseases are related to housing, water, and sanitation. But in time, control of these will be left-hand functions of the health department. As the chronic illnesses become more pressing problems, the emphasis will shift.

Until public awareness and financial resources and sufficient personnel make the shift possible, what can a health department do so far as cardiovascular diseases go?

A health department, with little or no extra expenditure of time, money, or energy, can accomplish much simply by becoming heart conscious—being aware of the entire cardiovascular problem and letting this awareness pervade thinking and planning in all service and education programs:

Films taken in mass X-ray surveys can be read for possible heart disease and suspected cases followed up for diagnosis and treatment.

In prenatal clinics, special attention can be paid to pregnant women who have congenital or acquired heart disease.

Programs to control communicable diseases can include control of streptococcal infections.

Laboratory facilities can be used for blood sedimentation rates and antistreptolysin-O titers in suspected rheumatic fever and throat cultures in suspected streptococcal infection; laboratory technicians can be trained in prothrombin-time determination.

Nursing and convalescent homes can be inspected from the point of view of nutritional requirements and physical limitations of cardiovascular patients.

In nutrition programs, emphasis can be placed on counseling as regards various nutritional needs, such as the low-sodium diet for hypertension and congestive heart failure, and on problems of overweight.

In school health surveys, children with congenital or rheumatic heart defects can be discovered. Through followup services they can obtain the care and management possible through a greatly expanded knowledge in the two fields. It is here that the Crippled Children's Program has so much to offer.

Public health nurses can be instructed in the nursing care of cardiac patients.

A clearer picture of the cardiovascular problem can be obtained through careful record-keeping.

In all health education programs, cardiovascular disease can be treated to dispel fear and replace it with a reasonable, more objective viewpoint. Teachers and parents can be informed about the relationship of streptococcal infections to rheumatic fever.

All these are things which health departments can do within their existing framework. A number of health departments, of course, are engaged in major programs related to cardiovascular disease.

The cardiovascular disease studies being conducted in Massachusetts, California, and New York State, among others, are calculated to give us the kinds of information that will more clearly define health department and heart association roles in prevention and control of cardiovascular diseases through organized community effort.

In these heart disease control programs, "prevention" is the key word. "Characteristically," writes Lester Breslow, chief of California's bureau of chronic diseases, "the public health approach to problems stresses prevention. As applied to heart disease and other chronic diseases, prevention includes measures which avert the occurrence of disease (primary prevention) and those which halt or retard the progression of disease into disability or premature death (secondary prevention)."

However much a health department is able to do now, and does do, it can be sure of having the help and support of its neighboring heart association. Heart association and health department alike are both working toward the prevention, in its broadest sense, of cardiovascular disease.

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Changing the priorities in public health*

George James, M.D., M.P.H.†

The health officer is often asked to describe his formula for starting new programs and getting rid of old unproductive ones. This chapter in the art of public health includes more than program development and is considered here under the broader heading, "Changing the Priorities in Public Health." During this era of rapid change in program content, health officers are forced to employ this art to an unusual degree. The present discussion is offered with the hope that some public health practitioners may be aided by statements that reduce their daily problems to simple generalizations which have "deductive fertility."

CRITERIA FOR DETERMINING A PRIORITY

The establishment of priority is one of the major responsibilities of the health officer and provides tangible evidence of his capacity for leadership.[1,2] Before giving consideration to changing priorities, it would be well to list some of the criteria for establishing them. Those listed below are suggested in part by Ascher [3,4] and are illustrated by examples from the public health field.

Urgency. There is no doubt that the health problems created by a smallpox outbreak or a flood deserve top priority. A breakdown in one of our major barriers against communicable disease, or a mass debacle of any kind, must receive our immediate attention.

Feasibility. Often a program could be readily undertaken with existing resources if a slight amount of effort were added. The teaching of self-breast palpation to middle-aged women by public health nurses can be given priority as part of each visit to a new family under the generalized public health nursing program. Similarly, the use of the tuberculosis mass chest X-ray survey for the detection of heart disease is another example of an extra dividend program.

Scope. Will the program be of benefit to a significant number of citizens or only a few? Will it be countrywide or only of value to one small area? It is obvious, for example, that higher priority will be given to a health education program on the early signs of cancer than one on muscular dystrophy.

Preparation for something more extensive. Dr. Ascher calls this the "multiplier effect." Some communities have developed a mobile physiotherapy unit to give simple treatments to home-bound patients with arthritis. This is deemed worthy of priority, since it is probably the first step in a more elaborate program of home care and rehabilitation for all varieties of chronic illness.

Coordination between existing programs. Several communities have invested heavily in programs of slum clearance and construction of low cost housing. Health units in those areas can gear their environmental sanitation activities to make the total program more effective. The health officer is often able to provide the cement which integrates the vital community programs of other agencies. Many examples of this can be found in existing air pollution, hospital planning, and mental health programs.

Practicality. This is the old concept of efficiency. When the expected return on a small program investment is very great, it becomes a practical matter to give that program a high priority. In this category one can place fluoridation of the public water supply, since at an annual cost of about 10 cents per capita a two-thirds reduction in dental caries among children can eventually be achieved. Another example is the allocation of official funds for the treatment of cases of ringworm of the scalp because of the far greater

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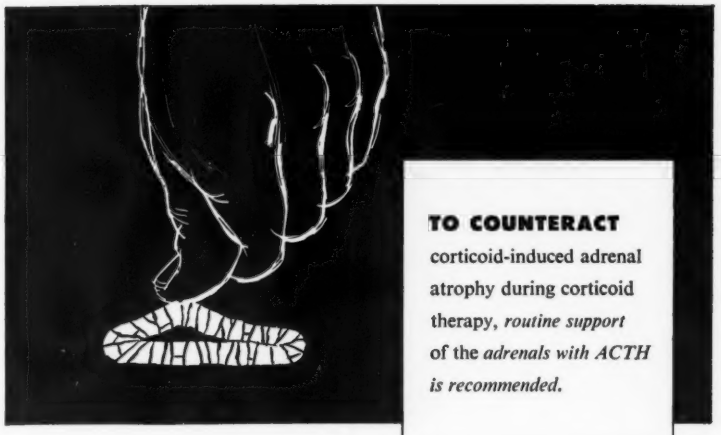
†Dr. James is director of health, Akron City Health Department, Akron, Ohio. He began his public health career in 1942 as assistant health officer in Williamson County, Tenn. In 1945, he began a decade of service with the New York State Department of Health and was serving as assistant commissioner for program development and evaluation prior to his present assignment. In addition, he has taught at the Yale University School of Medicine, Johns Hopkins School of Hygiene and Public Health, and the Albany Medical College of Union University. He presented this paper at the annual meeting of the Oklahoma Public Health Association, held November 9, 1955, at Stillwater.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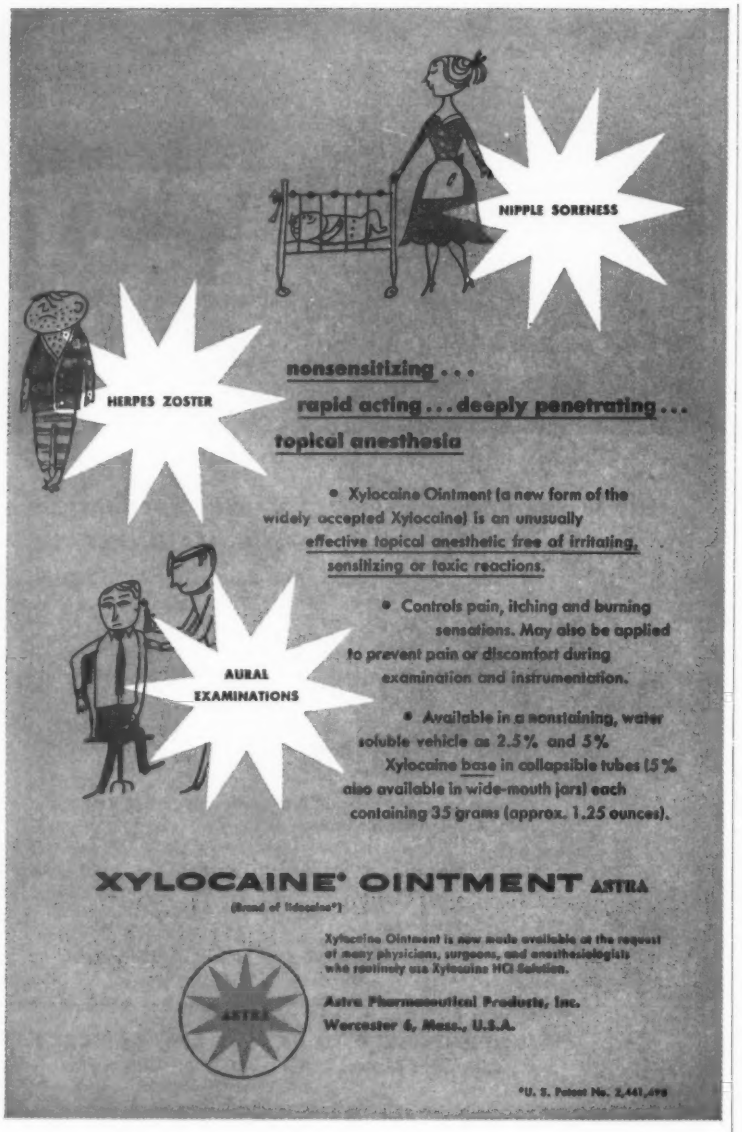
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community cost of the uncontrolled spread of this disease among school children.

Special ability or special mandate. By virtue of its unique skill or legal powers the health department is often the only one or the one best able to perform a particular service. The collection, tabulation, and analysis of morbidity and mortality data, the performance of health services for school children, and the development of inservice medical care programs in municipal government have fallen to the lot of some health officers. It would usually be impossible for a community to develop effective programs in these fields should the health officer fail to give them priority.

Good will. The performance of adequate health programs requires a background of community good will and support. Practically every health officer has, on occasion, given high priority to programs of low health importance as a matter of sound public relations. To avoid later confusion, the health officer should openly admit that the chief objective of such a health program is the enhancement of good public relations if that is the fact.

CHANGING THE PRIORITIES

The development of any health program requires attention to certain strategic factors in the community. With respect to any one program, these factors are favorable or unfavorable to some degree. If entirely favorable, active service may begin immediately; if unfavorable, various subsidiary developmental steps must precede the large-scale program.

The physician who performed a "Smithwick" operation for the hypertensive disease of an influential State legislator was in a favorable position to promote a State hypertension commission. The availability of Federal funds for State industrial hygiene services during World War II resulted in the development of such divisions in the States that had not yet established them. Support for special case-finding programs among hospital admissions by local tuberculosis associations has sold these services to many communities.

The health officer who always waits patiently for the time when strategic factors become favorable can be said to be selecting his priorities on the basis of passive opportunism, that is, priority is given to something dramatic and successful, not necessarily that which is most needed to meet local problems. Such a health officer looks for and pounces upon the health angle of any general project that catches the community's fancy. This evokes that comparison between a statesman and a technician in public health,[3] which may be applied to the opportunist. The opportunist in public health pursues fleeting, short-term, popular goals which are dramatic and sure of success; the statesman is not reluctant to lend his prestige to the struggle for those long-range goals which are greatly needed although temporarily neither popular nor feasible.

Lest one be tempted to develop a universal dislike for the public health opportunist, let him be advised quickly to correct that impression. Many of our excellent health programs in child health, medical rehabilitation, and research in chronic disease, owe their origin to a unique and happy combination of local factors. In fact, a health officer should be criticized for not taking advantage of such good fortune. Rather must the test of the practice of passive opportunism come from two other questions:

Having once seized the opportunity, has the health officer proceeded methodically and scientifically to build a firm and successful program, or has he dropped this one for the next fair prospect which loomed into his jurisdictional field?

Is his total program a conglomerate of activities which arrived opportunely, or has he left his impact upon the field of public health practice through programs developed with a greater sense of his own responsibility for determination of priority?

The health officer of today expects to develop programs even when local strategic factors are not quite satisfactory. This chapter on the art of public health practice is the crux of our current task in the establishment of useful programs against the chronic degenerative diseases and accidents. Several examples will be considered to illustrate how priorities can be changed in the absence of perfection in local strategic factors.

The active opportunist. A health officer can act the opportunist even if there are no current opportunities. This might be dubbed "the program plan approach."

This health officer sets many irons in the fire. When one of them gets hot, he steps in quickly and forges his program along the lines already planned. Instead of forcing a public reaction, the health officer needs merely wait for public opinion to force the program, which will be any of those he has been holding in readiness.

The danger of such an approach, is, of course, that full many an excellent program may be "born to blush unseen." The health literature is replete with excellent program plans which read well but recount only an idea, not a blueprint for action which was effectively taken. After all, how does one judge a program plan which has not been translated into action.

Again, let the reader be assured that there need be no invidiousness attached to this technique of changing priorities. In fact, it is to be highly recommended for those programs which reason tells us are due for the touch of Midas. Health officers would do well to plan thoroughly in the field of adult rehabilitation, home care, radiological health, and mental health. Yet, once having planned, should we not do something more with our script than file it away until D-Day? If not, is there not the distinct danger that some other agency, presumably less well qualified than the trained health department, will seize the initiative because it happens to be more available to certain newly developing strategic factors?

The demonstration. Long an honored approach to the changing of priorities, the demonstration is usually characterized by its heavy accent on quality service. Less well recognized is the fact that the demonstration should be used only when the health officer is sure of his scientific and practical grounds. A demonstration, it should be remembered, can also be taken by our critics as proof that something cannot be done.

In developing the project, care should be taken to bite off no more than can be thoroughly chewed. If you are planning a complete and integrated school health demonstration program, do not try to establish it in your entire district. One census tract, one school, or even one classroom may be all you can handle effectively without compromising quality. The demonstration team must be overstaffed; later on is time enough to prove we can do the job or the major part of the job with less expense and personnel. Public relations skill is required and care must be exercised. The population involved can learn to consider themselves unhappily as guinea pigs, or with good public education, as those fortunate few who are privileged to receive the first chance to participate in an excellent program.

The demonstration approach is useful today for diabetes detection programs, heart disease detection by mass survey, prophylactic treatment of cases of rheumatic fever, and tumor diagnostic clinics. It, perhaps, should not yet be used for obesity control, which still seems to be based upon too much scientific conjecture to be predictable.

The research approach. The research project differs from the demonstration in one major respect: Its scientific basis is not yet considered proved. In fact, the central idea of establishing the project is to discover more scientific evidence, although it may also render good service to the study population. Our welfare colleagues have coined the term "service-linked research" as a fitting description of this method of program development.[6]

The Albany Cardiovascular Health Center[7, 8] is a good example of this technique of changing priorities. The State civil service's male population between the ages of 40 and 54 are receiving a complete periodic cardiovascular evaluation under a project established by the New York State Department of Health. Not only is this project stimulating fundamental research among the team who are members of the staff of the Albany Medical College or the State Health Department, but it is also aimed at:

- Evaluating the validity and reliability of techniques for the early diagnosis of coronary heart disease and hypertension.
- Stimulating an interest in heart disease among the staff of this State health department and encouraging them to add heart disease studies and related projects to their own specific programs.
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prevention of first attacks of rheumatic fever among school children,[10] and home accidents[11] in certain areas. At times this technique is used to iron out the administrative features of a program based upon fairly sound scientific principles. The term, pilot project, is commonly, but not exclusively, associated with this use. Such projects do not necessarily require the firm scientific base of a demonstration project.

The get-ready approach. Realizing that he wishes to reach a distant, still unattainable goal, the health officer may undertake a minor program which has a great multiplier effect. This brings him much nearer to coming to grips with the major problem.

In New York State, a program of control of shoe-fitting fluoroscopes was used as the first step in a complete program in radiological health.[12] Noting the increasing scope of the problem of ionizing radiation, the department found that the relatively simple task of surveying and correcting the defective units among its 400 shoe-fitting fluoroscopes gave it the opportunity to:

- Acquire much data on the practical risks of ionizing radiation.
- Obtain equipment needed for radiological surveys.
- Stimulate citizen and staff interest in the problem.
- Develop inservice training, both academic and practical, for local health officers and sanitary engineers.
- Develop an extensive program plan, get additional staff, and obtain passage of a complete sanitary code chapter on radiological health.

The advisory committee. A problem such as radiological health, which touches many highly skilled professions, should be approached with the most expert advice. The available data must not only be accurate; it must be correctly interpreted. The implications of various control procedures must be appreciated and endorsed by the technical groups which are concerned. An advisory committee of leaders in these fields is essential.

The use of an advisory committee implies certain specific cautions over and beyond the obvious ones of obtaining the proper personnel to serve:

- Do as much work as you can before they convene. You cannot afford false starts. These are usually busy people who cannot take the time to teach you fundamentals. Study the field well, send someone away for a special course if it is unfamiliar, and consult in advance with a key member of the committee to be sure you are on the right track.
- Send the material to be considered to each member well in advance, indicating your sources of information, and if possible, areas of special discussion and decision.
- If the group changes the first draft materially be sure that each has an opportunity to review and comment on the final draft.

The technique of the advisory committee has worked unusually well with new programs based upon the self-policing of special groups. Besides its use in radiological health, a State has found it of value in developing a program involving the labeling of household products which may be hazardous if improperly used.[13] It has had an excellent trial in several areas for the development of programs of disaster control. Some health departments are now adopting the plan as a practical step toward good public relations in administration by having advisory committees of prominent citizens help define community needs and promote solutions.

The joint approach. Often a health officer can accomplish much by coordinating his efforts with those of another agency. His added increment of resources, though slight, may be precisely what is needed to make a worthwhile program a reality. At present, it is possible to work with cancer societies for the development of cancer registers, to tie diabetes surveys in with tuberculosis society mass X ray programs, and to engage in rheumatic fever prophylaxis programs with heart associations.

In the use of this technique, the health officer is urged to spell out the details of the arrangement in writing. Such problems as the duration of the program, the extent of its evaluation, the next steps, the implications to other programs, are well worth some thought in advance. No health officer should permit his complete program to bog down due to firm, long-range commitments made to so many agencies that he has ended by relinquish-

ing all rights to the determination of priority.

The advance on many fronts. Some health officers like to establish a balanced program of new activities; they insist upon having some entry that can be made under each category of public health activity. When something new arises, they do something about it, even if it is on a small scale. This is not a demonstration, not a well-planned approach, not research, not a pilot project, merely something to permit him to dabble lightly in a large variety of services.

If one mentions adult rehabilitation, this health officer reminds us that his public health nurses are following and attempting to return a few hemiplegics to self-sufficiency. If we bring up multiple screening, he has done some hemoglobin and diabetes tests at a county fair. If we mention home accidents, he had his statistician make a 2-month tabulation of patients treated at the emergency room of the local hospital and had a public health nurse follow up on a few of them.

Such public health dilettantism is not necessarily bad. It can be a good first step toward something better and, when this occurs, leads to the concept that there are really no new programs in public health, only changes in emphasis. Best of all, it is often the only way to cajole a reluctant staff. You can sell the care of Mrs. Fred Smith to a nursing division too busy to accept a "program" in adult rehabilitation. You can get a sanitarian to check the lighting in an apartment hallway when the explanation of your plans for a sanitation home-accident program falls on deaf ears. Using this oblique approach, one can get a community to accept a worthwhile cancer program even before it realizes that something new had been added.

UNLOADING THE OLD PROGRAM

Since there are, to put it mildly, limitations to the resources available to local health officers, the addition of new programs means that "something's got to give." Health officers fear, and rightly so, to end programs precipitously. Such action may lead to a general feeling of impermanence and consequent lack of fervid local support toward public health programs. Nevertheless, the old programs can be dropped under one of several methods:

Changing the character or purpose. The mass chest X-ray for tuberculosis will probably be used increasingly for heart disease and lung cancer detection while its original purpose declines in importance. The female clientele of a venereal disease clinic are easily available for cancer detection, particularly advisble since syphilis[14] and neglected cervicitis[15] are both considered to be precancerous lesions.

The knife. The development of modern knowledge about communicable disease control has permitted drastic changes in quarantine regulations and the free distribution of certain antitoxic serums. Occasionally, when available funds have been curtailed, health officers have found it feasible to do this.[16]

Demonstration in reverse. A real challenge awaits local health officers who would like to explore methods of streamlining some of our traditional health programs. Evaluation studies on the details of prepasteurized milk inspection, water and sewage plant inspections, and some of the routines of school health practice might prove that much current effort could be curtailed. Perhaps better, quick-screening techniques could be employed to give warning of those places or persons requiring detailed individual attention. Such demonstration in reverse, in the sense that it shows how the efficiency of our programs may be improved by curtailment, should result in the saving of effort which can then be diverted to more valuable services.

Plus-minus method. This method can also be called "accentuating the positive." By so doing, attention is drawn away from the unnecessary so that it can be de-emphasized. In milk-production control, one can accent cooling, clean equipment, and cow health, and allow cracks on the floor, area of window space, and certain required partitions to acquire less significance. Greater attention in cancer control can be given in some areas to teaching individual physicians how to perform cancer diagnosis rather than continue to multiply the number of expensive cancer detection clinics. In school health, the development of strong programs of teacher - nurse - parent con-

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		No.	Per cent of total	No.	Per cent of total	No.	Per cent of total
Proteus vulgaris	237	209	88.2	28	11.8	0	0
Escherichia coli (including paracolon bacillus)	281	255	92.7	23	8.2	3	1.1
Aerobacter aerogenes	223	183	82.1	40	17.9	0	0
Streptococcus faecalis	160	155	96.7	5	3.1	0	0
Pseudomonas aeruginosa	101	5	5.0	40	39.9	56	55.4
Micrococcus pyogenes var. aureus	6	6	100	0	0	0	0
Klebsiella pneumoniae	3	3	100	0	0	0	0
Alcaligenes faecalis	2	2	100	0	0	0	0

*Organisms inhibited by 100 µg./ml. or less are classified as sensitive, by 200 to 400 µg/ml. as moderately sensitive, and those not inhibited by 400 µg/ml. as resistant.

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ferences will draw attention away from unproductive, routine morning clinics.

Gradual attrition. Old programs which refuse to die might eventually fade away. County health units which have practiced rigid quarantine for certain common communicable diseases may hesitate to suggest a drastic change in keeping with modern control regulations. There is always the fear that any de-emphasis in control may spread to other disease programs. By avoiding all attempts at stimulating this particular program it can slowly wither until the community is better prepared to take a definite stand at modernizing quarantine regulations.

SUMMARY AND CONCLUSION

This discussion seeks to explore a small chapter in the art of public health practice dealing with the ways in which health officers add new services to their entire community health programs. Some of the criteria for the determination of priority are listed and certain principles presented to indicate how these priorities are changed. Examples of the development of new programs and de-emphasis of others are discussed. In general, we require two things of the modern health officer:

- Many individual approaches to public health practice.
- Precise and adequate communication on the plans and results of these practices.

From the mutual stimulation following the defense of his activities before a jury of his peers will come progress not only in the science of preventive medicine but in the health officer's own very special art of public health practice.

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Age trends in poliomyelitis*

The outlook in poliomyelitis, both immediate and long range, appears favorable. Up to the middle of July 1956, the number of reported cases in the United States was 28 percent lower than that in the comparable period of last year. The total number of cases for the current year cannot be estimated with any certainty at this time, however, because the incidence of the disease is usually concentrated largely in midsummer and early fall. Yet, it is noteworthy that in only two States in the South and the Southwest, where the seasonal rise normally occurs earlier than in the North, is the number of cases above that a year ago—and even there the increases are moder-

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Company, June 1956.

ate. Elsewhere in the country, California and Illinois are the only States to have experienced a serious rise thus far in 1956; in Illinois the increase has been due to the outbreak in Chicago.

The annual total of poliomyelitis cases in our country has decreased since the peak year 1952. Compared with 57,879 cases reported during that year, there were only 29,270 in 1955. The case rate in 1955—the number of cases per 100,000 population—was the lowest since 1947.

An outstanding feature of the poliomyelitis trend is the change in the age pattern of the disease. Older children and young adults have been constituting an increasing proportion of reported cases and deaths. Among white males, the death rates in 1953-55 were lower than those in 1930-42 through ages 5-9, but were the higher thereafter, the margin increasing with age. Compared with 1948-52, the death rates in 1953-55 were lower through ages 15-19, but for subsequent ages the rates for the two periods were about the same. With minor exceptions, the trend among females paralleled that for males.

As a result of these changes, the age contour of the mortality from poliomyelitis has been modified appreciably. In 1953-55, the death rates from the disease among white males varied but little until age 35, and then dropped sharply. For the preceding 5-year period, the rates rose to a peak at the elementary school ages, and then generally decreased with advance in age. In 1930-42, the death rates from the disease showed a continuous decline with age, beginning with early childhood. White females experienced a similar shift in age pattern, but the poliomyelitis death rates among them have been consistently lower than among males at every age group.

The age changes in the distribution of poliomyelitis cases are in line with those for deaths. The morbidity trends are best seen in the data on paralytic poliomyelitis, because in a considerable number of cases reported as non-paralytic the diagnosis of poliomyelitis is open to question. Long-term data on paralytic cases by age are available for only a few areas, but these show fairly consistent trends. Thus, in California, where the general incidence of the disease has been high since 1948, the rate of paralytic poliomyelitis between 1936-39 and 1952-53 increased more than threefold under age 25 but rose sixfold at ages 25-44. An increasing proportion of the paralytic cases in California has been occurring at ages 25 and over, the figure reaching 22 percent in 1952-53. Trends similar to those for California are found in Massachusetts, Minnesota, and the city of Baltimore.

The shift in the age pattern of poliomyelitis may be the result primarily of a rise in the age at which natural immunity is acquired, the latter possibly reflecting the lessened frequency of exposure among children. That the use of the Salk vaccine provides some immunity to paralytic poliomyelitis is indicated by the fact that in 1955 a sharp drop occurred in the frequency of hospital admissions of such cases at ages 7 and 8—the ages at which the immunization program was largely concentrated last year. Furthermore, in upstate New York last year the rate for paralytic poliomyelitis at ages 6-10 was 21 per 100,000 among the unvaccinated and only 4 per 100,000 among the vaccinated. This study showed, in addition, that the rate was lower among those receiving two doses of the vaccine than among those receiving only a single dose. Similarly, in Massachusetts, which experienced a severe epidemic in 1955, the rate of paralytic poliomyelitis was 157 per 100,000 among unvaccinated children, compared with 63 among children receiving one dose of vaccine and with an even lower rate among those receiving more than one dose.

Various studies indicate that pregnant women are particularly vulnerable to poliomyelitis. Thus, in an outbreak in Minnesota in 1952,† the age-adjusted attack rate among pregnant women who were in contact with poliomyelitis cases was four times the rate among nonpregnant women in the childbearing ages similarly exposed. A study in New York City in 1949-53‡ showed that the estimated incidence of paralytic poliomyelitis in pregnant women was about twice that

†Paffenbarger, R. S., Jr., and Wilson, V. O., "Previous Tonsillectomy and Current Pregnancy as They Affect Risk of Poliomyelitis Attack," *Annals of the New York Academy of Sciences*, September 27, 1955, page 856.

‡Siegel, M., and Greenberg, M., "Incidence of Poliomyelitis in Pregnancy," *The New England Journal of Medicine*, November 17, 1955, page 841.

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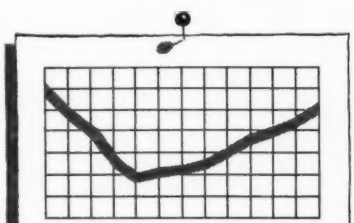

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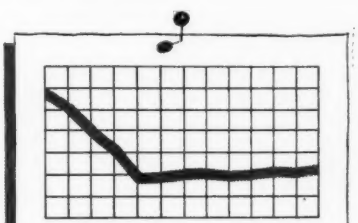

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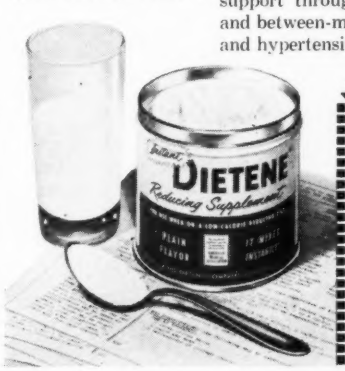

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in the nonpregnant. It was further observed that the rate was higher in women who had previously had only one live-born child than in those who had borne none or more than one, and was highest in the last trimester of pregnancy.

The recent decline in the incidence of poliomyelitis is distinctly encouraging, but the optimism should be tempered. A prominent characteristic of the disease is its tendency to vary widely in incidence from year to year. As recently as 1947, the annual number of cases in the United States was only about 10,000. Moreover, while the results of the Salk vaccine hold out great promise, it will be some years before its long-term effectiveness can be established definitely.

Longevity at record high in 1954*

The average length of life (expectation of life at birth) of the American people reached a new high of 69.6 years in 1954. This represented an increase of 4.4 years in a decade and of 20.4 years since 1900-02, when the average was 49.2 years. Thus, the expected lifetime in the United States has been extended by more than 40 percent thus far in the 20th century. In 1954, as in prior decades, white females had the best record for longevity. Their expectation of life at birth rose to 73.6 years, compared with 67.4 years for white males; for the nonwhite population, the corresponding figures were 65.8 years and 61.0 years, respectively.

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Company, June 1956.

The gains in expectation of life have been largest in childhood and least at the older ages, which is evident from the trend since 1900-02 for the white population at selected ages. Thus, the average remaining lifetime at age 20 increased about eight years for males and 12 years for females. At age 45, the corresponding gains were 3.3 years and 6.7 years. Although the outlook has improved relatively little past midlife, at least one half of the population reaching age 65 can now look forward to celebrating their 78th birthday. In 1954, life expectancy at age 65 was 13.1 years for white males and 15.7 years for white females.

The prolongation of life in the United States has resulted in large measure from the marked downward trend in the death rate from the infectious diseases. Inasmuch as a half century ago these diseases constituted a dominant part of the mortality among children and young adults, they have been the principal beneficiaries of the favorable trends. Since 1900-02, the death rate has declined by more than three fourths at the ages prior to midlife, but by less than one third after age 65. Among white females, in particular, mortality has dropped to remarkably low levels. In 1954, the death rate among them was under 2 per 1,000 in the age range 1-39. Among white males, the corresponding range was almost as wide—from ages 1 through 33. Moreover, the death rate remains under 10 per 1,000 until age 59 among white females and until age 51 among males.

The improvement in mortality has been more rapid among nonwhite persons than among the white. Nevertheless, the nonwhite population is still subject to a much higher rate of mortality throughout the greater part of the life span. Currently, two fifths of the nonwhite male babies fail to survive to age 60, compared with only one fourth of the white. Among females, the disparity is even greater. In fact, all during the childbearing period and well beyond, the mortality rate for nonwhite females is double or triple that for white females.

It is unlikely that the remarkable progress of the past half century will be duplicated. Some further reductions in mortality will undoubtedly be effected by continuing advances in the control of the infections and of accidents. However, mortality is already so low at the younger ages that future gains prior to midlife would add relatively little to the average length of life in our country. For example, if it were possible to prevent all deaths before age 42, expectation of life at birth would be increased by an amount equal to the gain of the past decade, namely, by about 4½ years. In fact, even if there were no deaths at all

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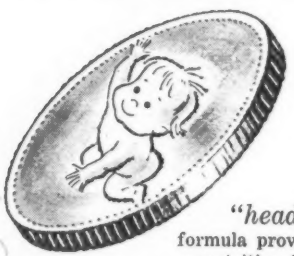

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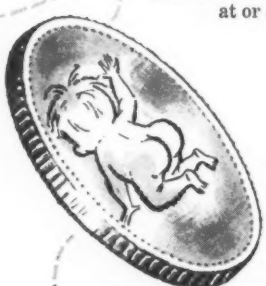

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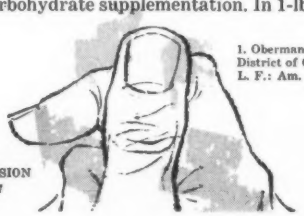

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before age 60, longevity would be extended eight years, or by only two fifths of the increase since the turn of the century. It is apparent from these facts that substantial gains in the future will be dependent largely on our success in preventing or postponing the cardiovascular-renal diseases and cancer, which are the preponderant causes of death in the middle and later years of life.

Books received

Books received for review during the period from August 5 to September 5, 1956, are listed below. Reviews will be published as space permits.

ROENTGEN SIGNS IN CLINICAL DIAGNOSIS. By Isadore Meschan, M.A., M.D., Professor and Director of the Department of Radiology at the Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, North Carolina; Formerly Professor and Head of the Department of Radiology at the University of Arkansas School of Medicine, Little Rock, Arkansas; with the Assistance of R. M. F. Farrer-Meschan, M.B., B.S. (Melbourne, Australia). Cloth. Pp. 1058, with illustrations. Price $20.00. W. B. Saunders Company, West Washington Square, Philadelphia 5, 1956.

CLINICAL UROLOGY FOR GENERAL PRACTICE. By Justin J. Cordonnier, M.D., F.A.C.S., Professor of Urology, Washington University School of Medicine, St. Louis, Missouri; Chief of the Department of Urology, Barnes, St. Louis Children's, and Allied Hospitals; Chief of Urology, Washington University Clinics; Consultant in Urology, U.S. Veterans Hospital, St. Louis, Missouri. Cloth. Pp. 252, with illustrations. Price $6.75. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1956.

HEAD INJURIES AND THEIR MANAGEMENT. By Francis Asbury Echlin, M.D., C.M., M.SC., MED. SC.D., F.A.C.S., Professor Clinical Neurosurgery, New York University—Postgraduate Medical School; Neurosurgeon, Lenox Hill Hospital; Attending Neurosurgeon, Bellevue Hospital and New York Eye and Ear Infirmary; Consulting Neurosurgeon, St. Luke's Hospital, Newburgh, and Kingston Hospital. Cloth. Pp. 127, with illustrations. Price $3.00. J. B. Lippincott Company, East Washington Square, Philadelphia 5, 1956.

THE SPINE. Anatomico-Radiographic Studies —Development and the Cervical Region. By Lee A. Hadley, M.D., Senior Attending Roentgenologist, Syracuse Memorial Hospital; Clinical Associate Professor of Public Health, New York State College of Medicine; Consultant in Radiology, Syracuse State School, Syracuse, New York. Cloth. Pp. 156, with illustrations. Price $6.50. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., 1956.

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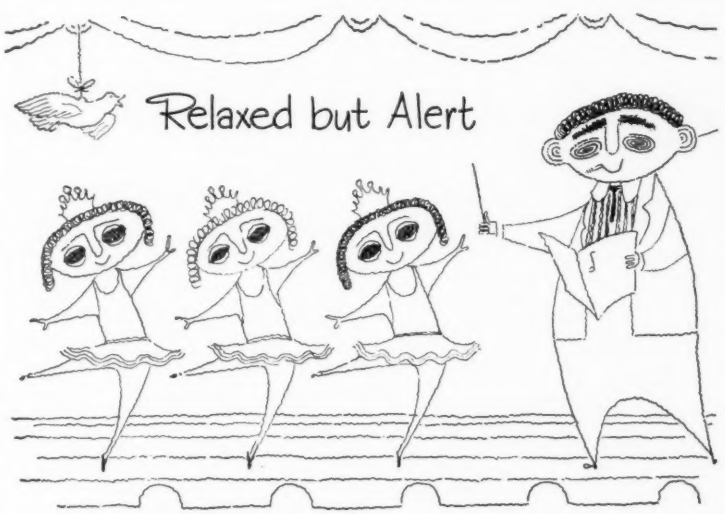
SURGERY FOR GENERAL PRACTICE. By Victor Richards, M.D., Professor of Surgery, Chairman of Department of Surgery,



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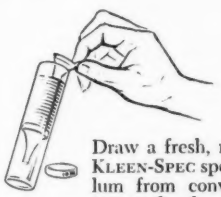

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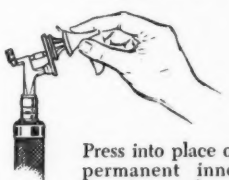

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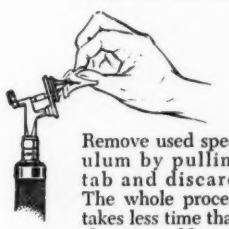

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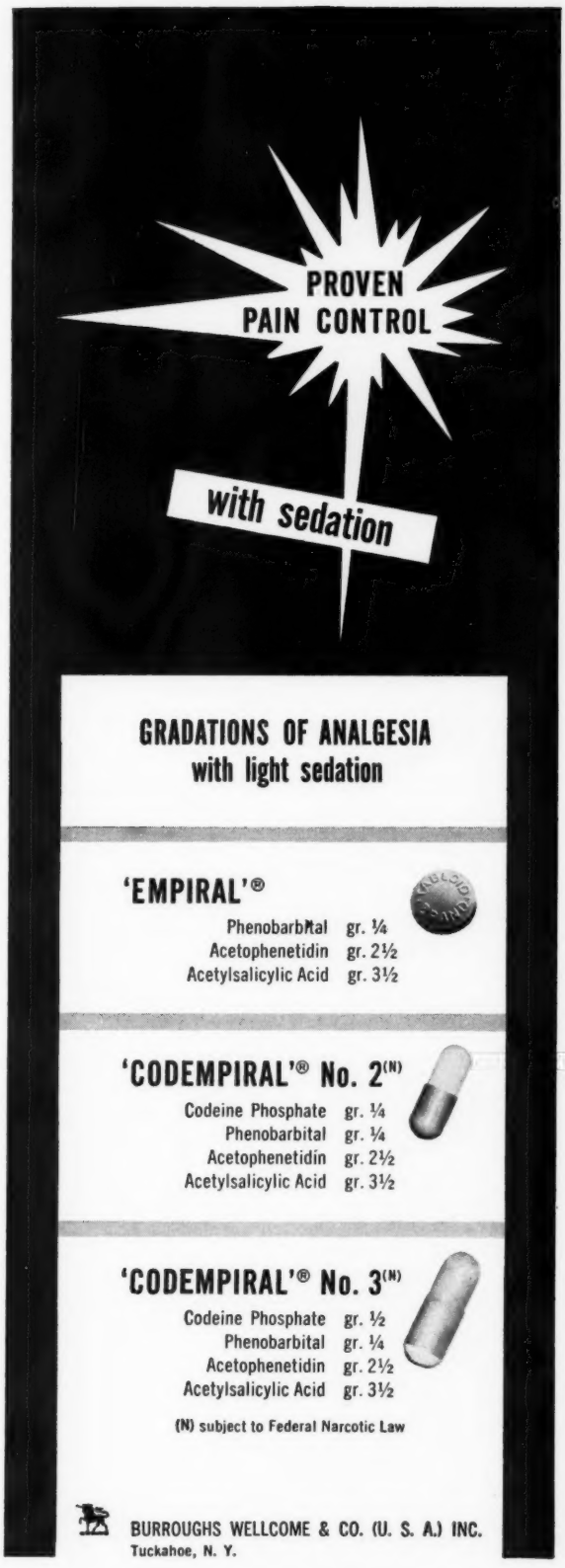

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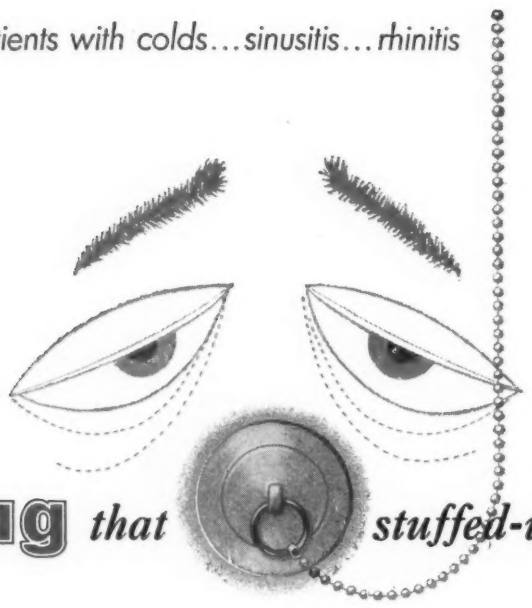

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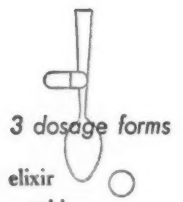

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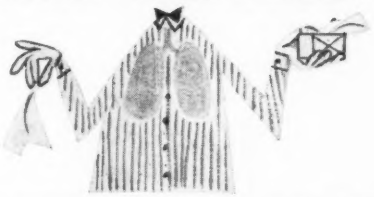

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1. Karnaky, K. J.: Urol. & Cutan. Rev. *48*:812 (Nov.) 1938. 2. Lanceley, F., and McEntegart, M. G.: Lancet *1*:668 (Apr. 14) 1953. 3. Karnaky, K. J.: J.A.M.A. *155*:876 (June 26) 1954. 4. Davis, C. H.: West. J. Surg. *63*:53 (Feb.) 1955.

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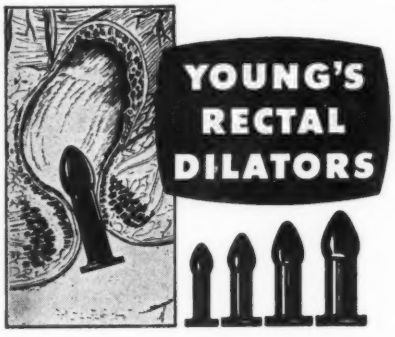

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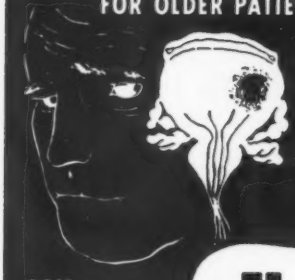

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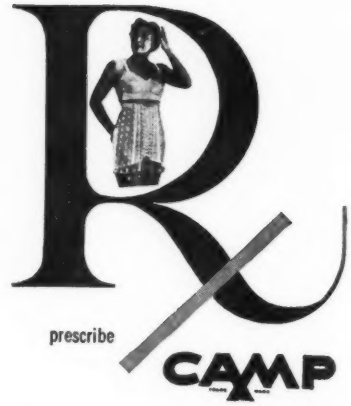

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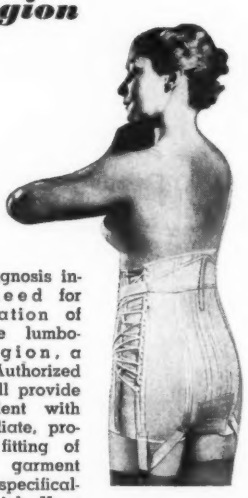

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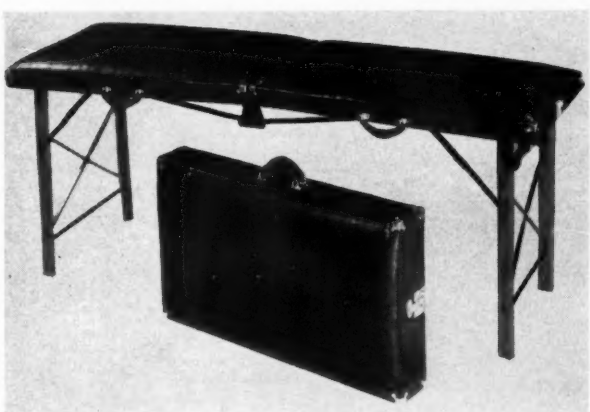

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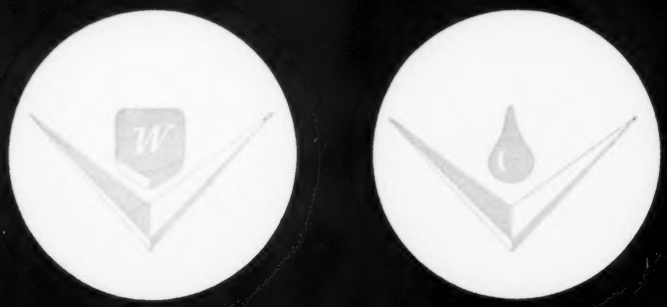

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37, 81 American Optical
100, 105, 106 American Osteopathic Assn.
65 American Sterilizer Co.
56 Ames Co.
83 Armour Laboratories
103 Arnar-Stone Laboratories, Inc.
79 Ascher, B. F., Co.
84, 92 Astra Pharmaceutical Prod.
64, 70, 94, 95 Ayerst Laboratories

82 Bard-Parker Co., Inc.
14 Baum, W. A., Co.
102 Borcherdt Malt Extract Co.
90 Borden Co.
68 Boyle & Co.
Cover 2, 10, 46 Bristol-Myers Co.
74 Burdick Corp.
96, 97 Burroughs Wellcome & Co.

104 Cambridge Instrument Co.
102 Camp, S. H., Co.
44 Carnation Co.
60 Chatham Pharmaceuticals, Inc.
91 Chicago Pharmacal Co.
Cover 4, 4, 61 Ciba Pharmaceuticals

104 Davis Co., F. A.
88 Desitin Chemical Co.
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69 Leeming, Thos. & Co., Inc.
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18, 19, 39, 57 McNeil Laboratories, Inc.
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Cover 3, 30, 55, 101 Riker Laboratories
78 Ritter Co., Inc.
25, 110 Robins, A. H., Co.
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73 Sandoz Pharmaceutical Co.
Cover 1 Saunders, W. B., Co.
12, 13, 51 Schenley Laboratories
3, 21, 34, 35 Schering Corp.
43, 100 Schmid, Julius, Inc.
86 Sherman Laboratories
109 Shield Laboratories
66, 67 Smith-Dorsey
17, 36, 112 Smith, Kline & French

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45 Upjohn Co.

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26, 27, 62, 63 White Laboratories, Inc.
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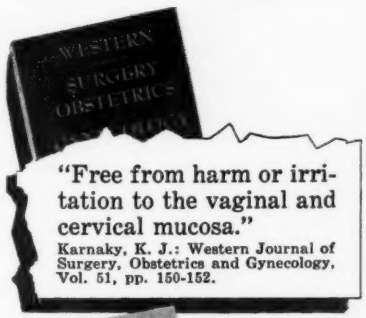
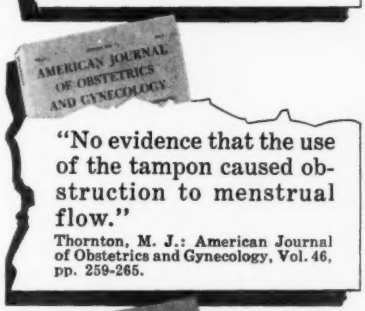
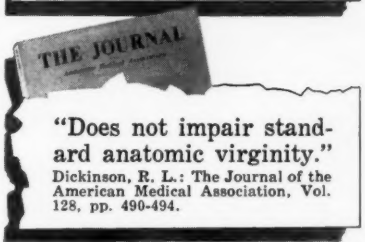


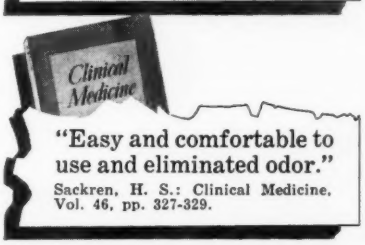
"Free from harm or irritation to the vaginal and cervical mucosa."
Karnaky, K. J.: Western Journal of Surgery, Obstetrics and Gynecology, Vol. 51, pp. 150-152.



"No evidence that the use of the tampon caused obstruction to menstrual flow."
Thornton, M. J.: American Journal of Obstetrics and Gynecology, Vol. 46, pp. 259-265.



"Does not impair standard anatomic virginity."
Dickinson, R. L.: The Journal of the American Medical Association, Vol. 128, pp. 490-494.



"Easy and comfortable to use and eliminated odor."
Sackren, H. S.: Clinical Medicine, Vol. 46, pp. 327-329.

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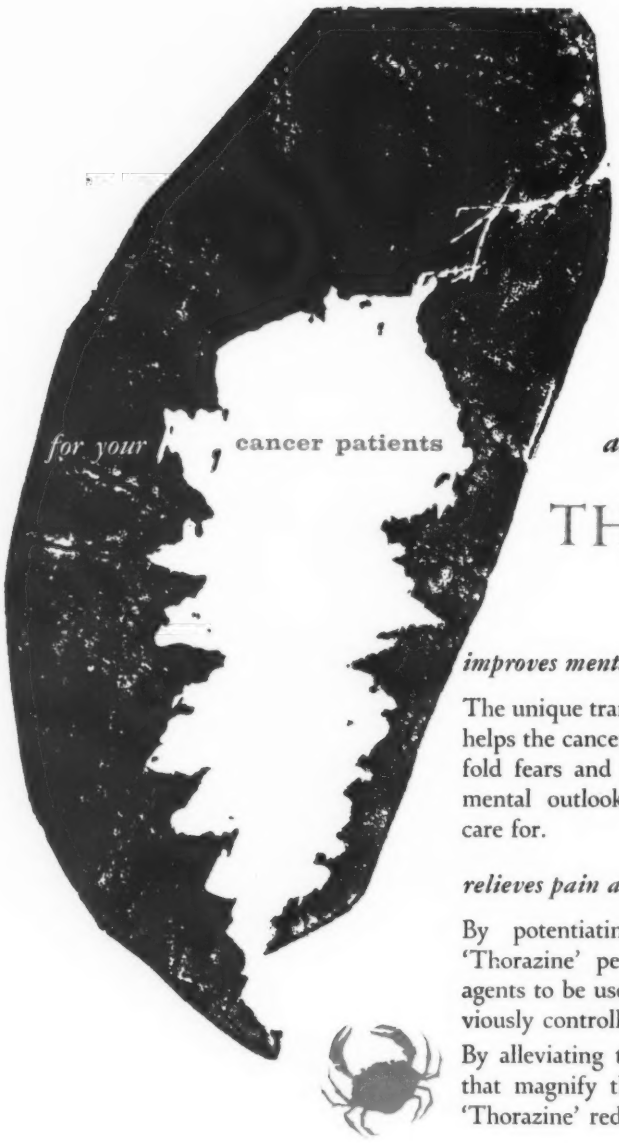

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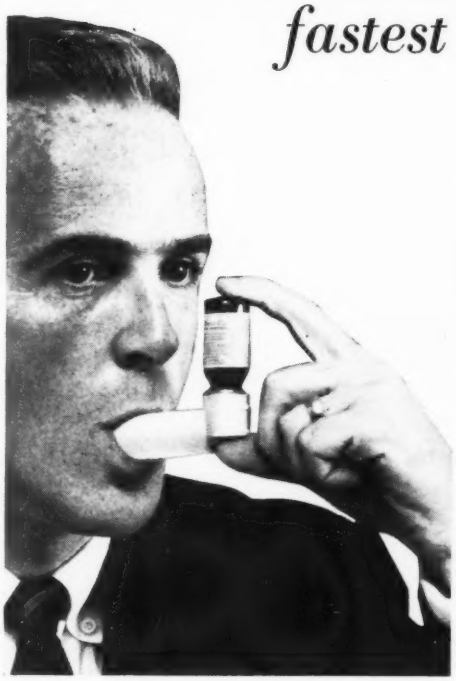

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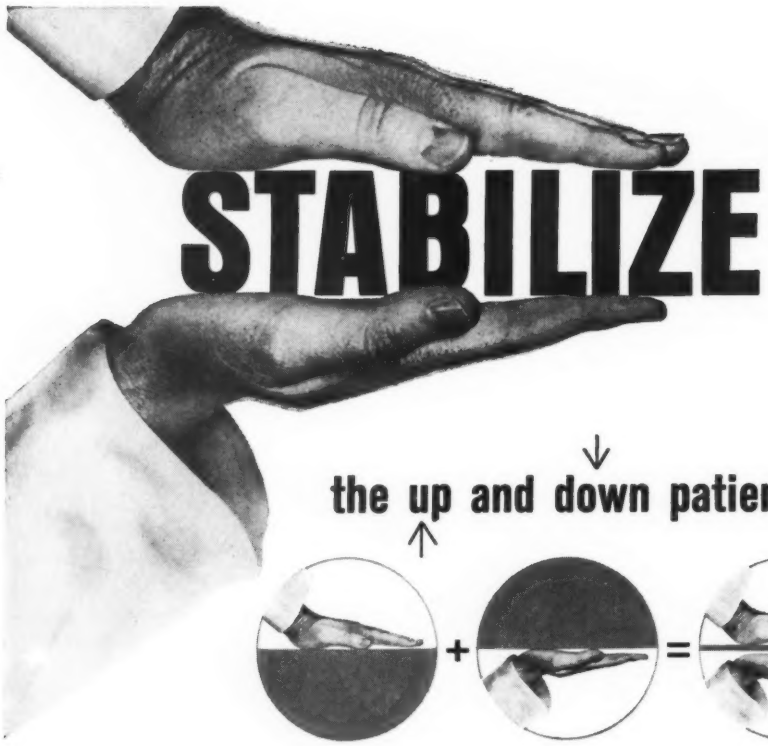
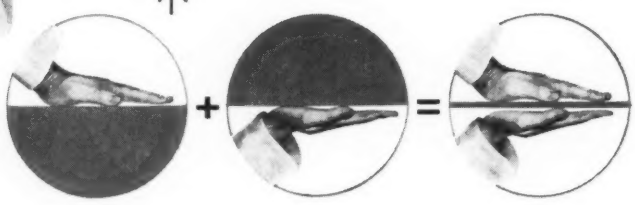


the up and down patient



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1. Arnoff, B.: Personal communication. 2. Lazarte, J. A., and Petersen, M.C.: Personal communication.

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